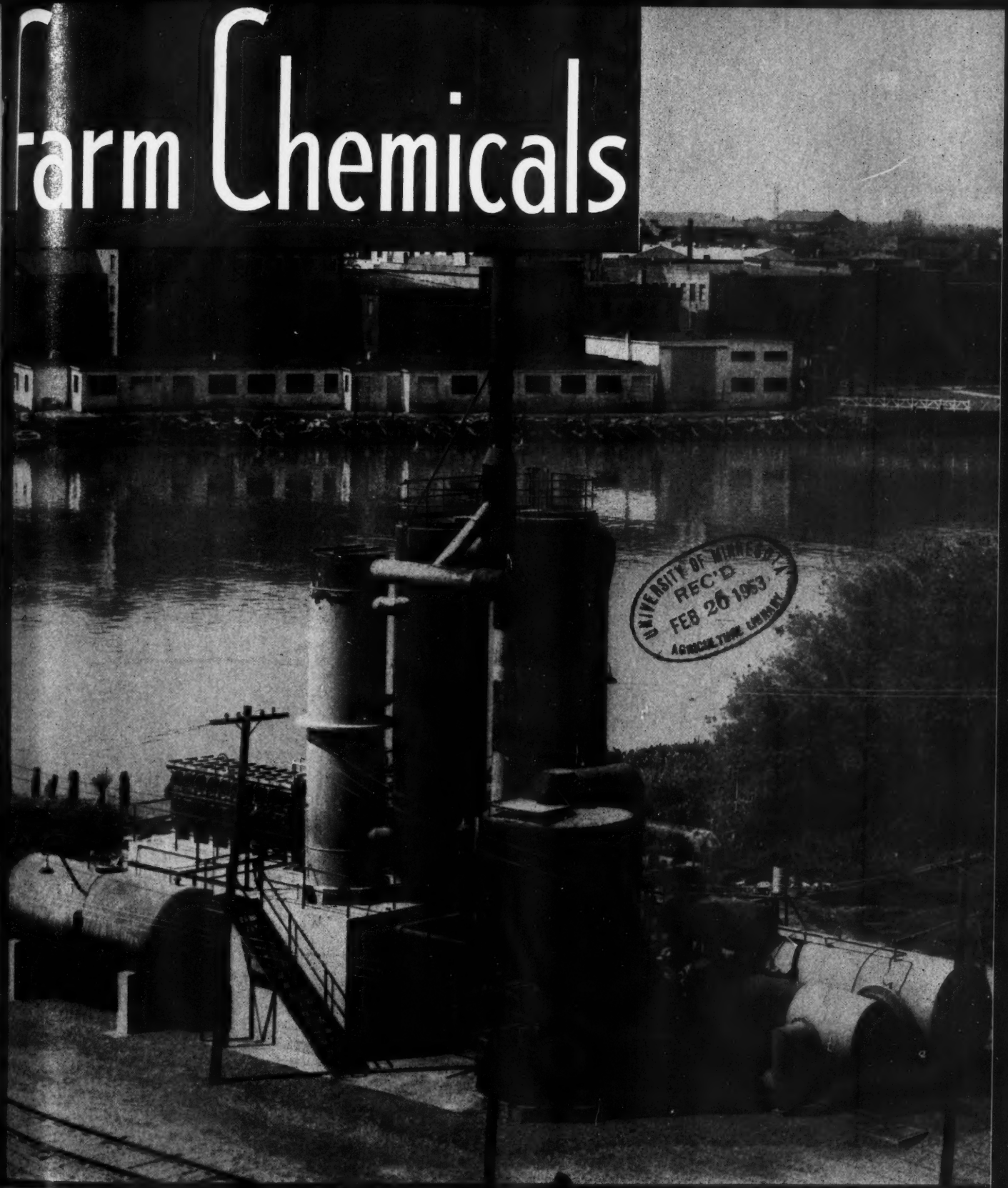
Farm Chemicals



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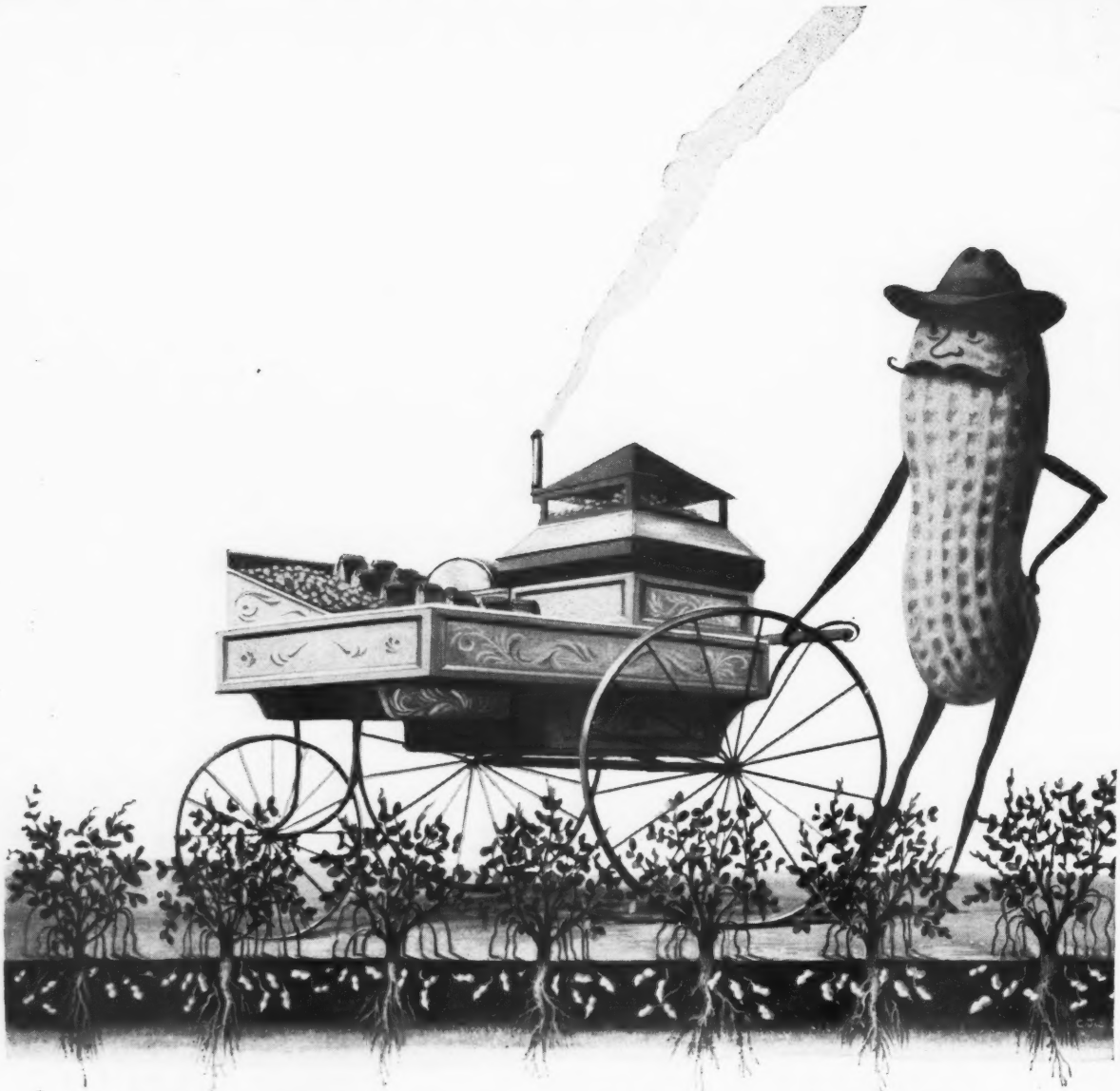

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In these days of industrial pressure, when *dependability* is a fervent wish as well as a word, men to whom Multiwalls are important are placing an increasing share of their orders with Union.

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*August, 1951 research study.

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In this issue . . .

Alanap will be marketed during the 1953 growing season for use on vine crops only. It will not be marketed for general use. That's the latest news from the Naugatuck Division of U.S. Rubber Co. For other news on the weed killer which has several advantages over the earlier 2,4-D, read the article on page 12.

Almost as fascinating as the many unusual experiments research workers have been carrying on for years to determine the most advantageous placement of fertilizer on crops are the machines which have been designed to do the job. For a picture story on the almost Rube Goldberg-like machines and how they are operated, turn to page 15.

Granulated insecticides—that's one of the later developments in the pesticide field. The materials are sprayed from planes and do a better job than the ordinary spray method. Dr. M. D. Farrar, head of the Department of Entomology and Zoology at Clemson Agricultural College, described the new materials at the recent entomology convention in Philadelphia. See his article on page 20.

One of the most progressive companies we've written about in our series on farm chemical manufacturers is the Southern Fertilizer & Chemical Co., of Savannah, Ga. For the fifth story in our series, turn to page 24.

Parathion may be a deadly pesticide, but mosquitoes in some sections of California started to laugh at it a while back. That's when entomologists in the region pooled their efforts and came up with at least a temporary answer: substitution of EPN and other organic phosphate materials to overcome the EPN-resistance problem. See page 27.

A French company has been producing a granulated nitrophosphate fertilizer product successfully for 11 years in several plants. Read about the setup of the St. Gobain process in this issue. Story is on page 31.

You company executives who have the responsibility for introducing new products in the farm chemicals line have many problems. J. V. Miller, director of sales development for Atlas Powder Co., shares them with you. For his discussion of the job, see page 39.

Any company safety program must contain some provision for fire prevention. It's a big job, as anyone who has ever been faced with the task must know. G. G. Blair concludes his two-part discussion of fire prevention in fertilizer plants on page 46 in this issue. He lists some helpful pointers that may be of assistance to other manufacturers.

farm chemicals

Formerly
American Fertilizer & Allied Chemicals
Established 1894
PIONEER JOURNAL OF THE FARM CHEMICALS INDUSTRY

Vol. 116 **FEBRUARY, 1953** **No. 2**

Contents

	PAGE
Briefly Noted	7
Alanap	12
Fertilizer Placement Machines	15
Granulated Insecticides	20
Southern Fert. & Chem. Co.	24
EPN for Mosquitoes	27
Complex Fertilizers	31
Introducing New Products	39
Fire Prevention in Fertilizer Plants	46
Market Letters	53
Industrial News	57
Editorial	76

Cover Story

The contact sulfuric acid plant on Hutchinson Island, Savannah, Ga., is one of the most important parts of the Southern Fertilizer and Chemical setup on the island. The plant was built by the Nicolay Titlestad Corp., New York City. For a complete story of Southern's progress in the fertilizer industry, see page 24.

A magazine international in scope and circulation and devoted to manufacturers, mixers, and formulators of fertilizers and pesticides

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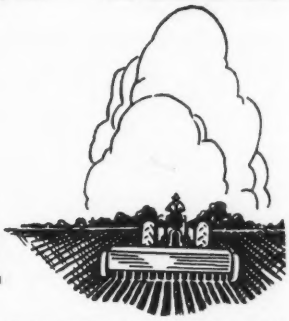

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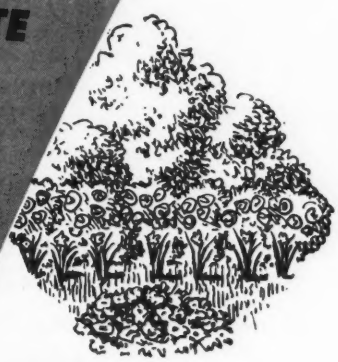

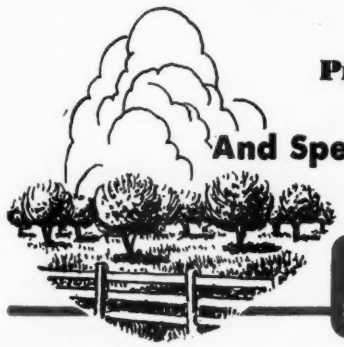

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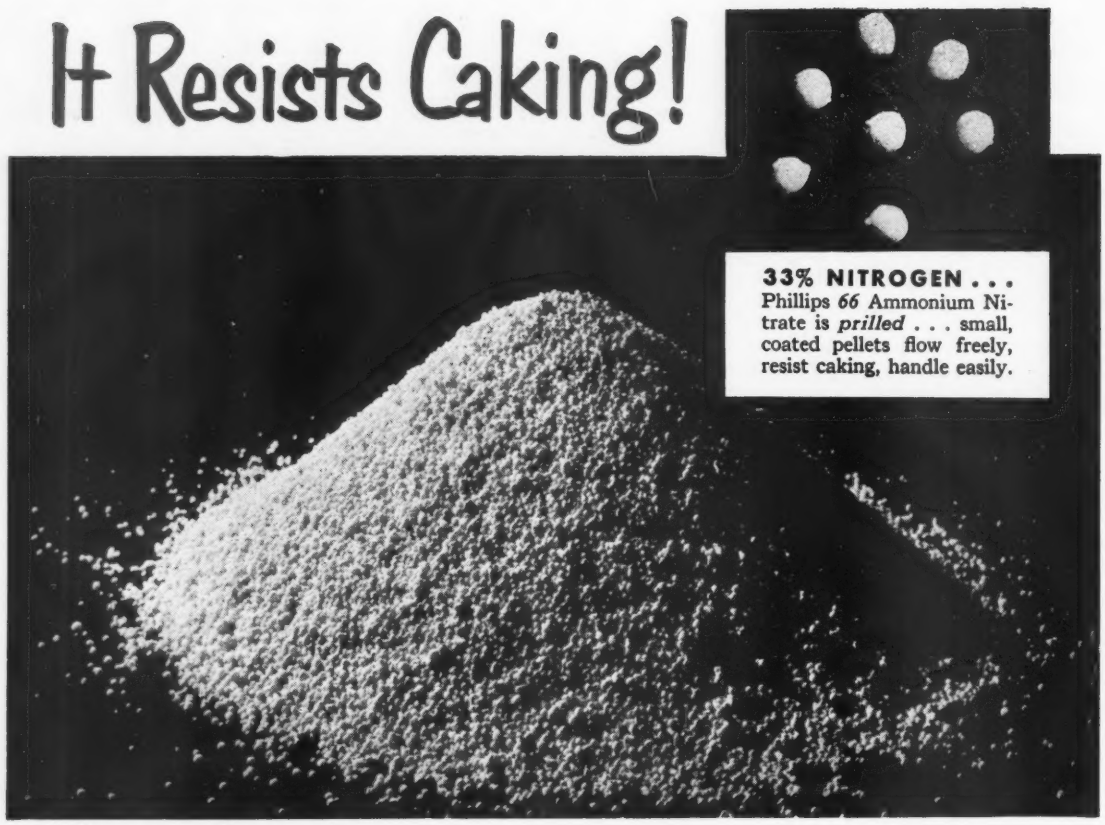

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Nitrogen is in great demand. Even Phillips tremendous capacity isn't equal to today's requirements. But we're making four different kinds of high-quality nitrogen material for mixers and farmers.

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2. NITROGEN SOLUTIONS . . . there are three Phillips *66* Nitrogen Solutions for use in the preparation of high-analysis fertilizers and the ammoniation of super-phosphate. These solutions keep handling costs low . . . promote rapid, thorough curing.

3. ANHYDROUS AMMONIA . . . Phillips *66* Agricultural Ammonia contains 82% N. Convenient, economical source of nitrogen for fertilizers.

4. AMMONIUM NITRATE (see photograph and description above).

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farm chemicals facts

. . . Briefly Noted

New chief sales engineer for Davidson-Kennedy Co., Atlanta, manufacturers of fertilizer machinery, is **Ernest C. Kontz.** Kontz will head the sales and engineering departments, coordinating the activities of both.

Kontz

He is a graduate of Georgia Tech and has operated his own manufacturing plant for the past several years. Kontz served in World War II in the Pacific, attaining the rank of Lt. Col.

Year end bonuses were distributed to employes of John Powell & Co. for the 22nd consecutive year late in 1952. The profit sharing plan, on which the bonuses are based, involved more than $30,000 last Christmas. Bonuses ranged from 4 to 8 per cent, depending on seniority.

New member of the staff of H. J. Baker & Bro., is William E. Merritt. He was associated with the Chilean Nitrate Sales Corp. and Ashcraft-Wilkinson Co. before joining Baker.

College students interested in chemistry will be aided next fall when a new DuPont assistance program goes into effect. Under the plan 32 colleges will receive new fellowships or grants at a cost to the company of approximately $600,000.

Charles T. Crandell has been appointed sales manager of the Saxolin open mesh department of Chase Bag Co. Crandell has served Chase for the past eight years. Since 1948 he has been assistant to Ben Deutsch who retired as sales manager of the department last December.

New sales manager of rock phosphates for International Minerals & Chemical Corp. is Sidney T. Keel. He formerly was domestic sales manager of the division. Keel has been with International for 12 years.

New district manager for California Spray is R. A. Fisher. He is in charge of the new section comprising Arizona, New Mexico and western Texas.

Two new insecticide concentrates have been added to its line by Prentiss Drug & Chemical Co. The chemicals, "Prentox Pyronyl 20 Concentrate" and "Prentox Pyronyl Roach Spray Concentrate" are said to combine the effectiveness and safety of pyrethrum extract with the economy of certain synthetic chemicals, without disadvantages in regard to toxicity.

Production of Crag 341 fungicide will be boosted this year by Carbide and Carbon Chemicals by 250 per cent, according to company plans.

Succeeding David B. Scott as general sales manager in the west for American Potash & Chemical Corp. is W. J. F. Francis.

Stauffer Chemical has appointed Wilson & Geo. Meyer & Co. as its exclusive sales agent for triple superphosphate, phosphoric acid and other farm chemicals to be manufactured at the Salt Lake City plant of Western Phosphates, Inc., for whom Stauffer is distributor.

Stuart T. Hodes has joined the Corona Chemical Division of Pittsburgh Plate Glass Co., in its Moorestown, N. J. office.

First successful treatment of diseased plants with terramycin, penicillin and other antibiotics was described in a film shown last month before the Maryland Vegetable Growers Association. The film, a record of experimental work done at USDA's Beltsville station, was produced by **Chas. Pfizer & Co.,** world's largest producer of antibiotics.

CALENDAR

Feb. 5-7—Eastern Pest Control Operators Conf., U. of Mass.
Feb. 9-11—Assoc. Southern Ag. Workers, New Orleans, La.
Feb. 17-18—5th Annual Soil Fertility Conf., Vincennes, Ind.
Feb. 20—Joint College—Fert. Ind. meeting, sponsored by Middle West Soil Imp. Comm., Chicago.
March 11-13—NAC Spring Convention, New Orleans, La.

Howard C. Peterson Jr. has been named district manager of the Southwestern sales district of St. Regis Paper Co.'s multiwall bag division. He succeeds H. S. Rhodes who was appointed general manager of the company's field engineering department.

Insecticide manufacturing accounted for consumption of 86,339 tons of Fuller's Earth in 1951 or 18 per cent of the national total, the Bureau of Mines reported last month. Production of the material exceeded all previous records.

The agricultural chemicals department of Canadian Industries, Ltd. has developed a seed treating chemical which it says will control wireworms and grain smuts in a single operation. It's called Dual-Purpose Benesan.

Gage

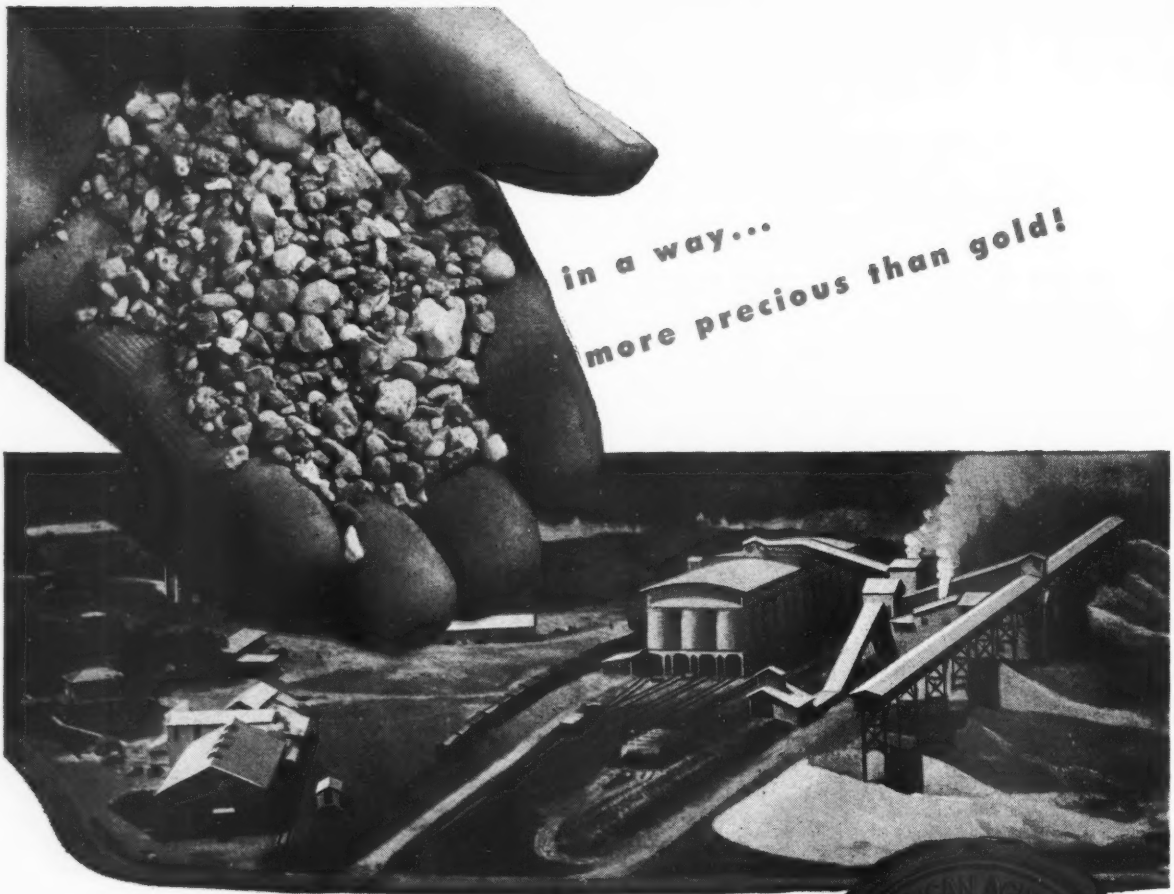
William P. Gage, formerly of Shell Chemical Corp., became president and a director of **Grace Chemical Co.,** Feb. 1. He had served as vice president in charge of manufacturing for Shell since 1941.

Gage joined Shell in 1929 in the research lab at Wood River, Ill. He later was named head of Shell's research and development department at the head office.

A million dollar fertilizer plant will be built at New Albany, Ind., by Davison Chemical Corp. It will incorporate facilities for production of Davison Homogenous Granulated Mixed Fertilizer, the company announced. It's scheduled to be completed by fall.

For his work in developing the soil conditioner Krilium, Dr. Ross Melvin Hedrick, chemist of Dayton, O., was named one of 10 outstanding men of 1952 by the United States Junior Chamber of Commerce.

Label approval was given recently for an aldrin-fertilizer mixture for corn rootworm control, Julius Hyman & Co., division of Shell Chemical Corp., announced. It is the initial registration of an **aldrin-fertilizer mixture.**



Air view showing dryers and rock storage at Pierce, Florida, headquarters of A.A.C. phosphate mining operations. (Top) Sample of Florida Pebble Phosphate Rock, source of phosphorus widely used in the chemical industries, in its elemental form as well as in phosphoric acid, phosphates and phosphorus compounds. Q. This pebble rock is also the principal source of the most important—and most generally deficient—plant food element. Often called the Key to Life, phosphorus is essential in maintaining and improving crop yields. Health, growth, life itself, would be impossible without phosphorus . . . so in a way these phosphate pebbles are more precious than gold.

AA Quality...

for over 85 years a symbol of quality and reliability

principal AA QUALITY products

All grades of Florida Pebble Phosphate Rock **AA QUALITY Ground Phosphate Rock**
All grades of Complete Fertilizers **Superphosphate**
Gelatin **Bone Products** **Salt Cake** **Ammonium Carbonate**
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farm chemicals outlook

Report from Washington
by Fred Bailey & John Harms

Optimistic outlook for business in 1953 does not apply to agriculture. Farm trend is counter to overall current. This has important meaning for those that sell the farm market.

Business generally is to continue at high levels, at least for much of 1953. All signs point in that direction . . . most economists are now agreed on it. Momentum of 1952, carrying into 1953, likely will shove time of crisis, downward adjustment over into 1954.

Momentum for agriculture, which began with Korea, began slowing in 1952 as the rest of industry, business set a faster pace. Farm momentum is to slow more in 1953.

Agricultural prices took a dramatic pasting last year . . . wound up a whopping 12 per cent under the year before.

For 1953, it's to be more of the same. Truman Administration predicted, optimistically, that prices would dip a relatively conservative five per cent during 1953, on top of the 12 per cent for 1952.

Other, more pessimistic soothsayers, look for a bigger drop . . . possibly as big as the one of 1952.

Down-trend of farm prices will cut farm income . . . money available to farmers to buy things they need for production. Net income points downward to around $14 billion . . . more than five per cent less than 1952.

Record farm marketings this year will bolster farm cash receipts, keep them from drooping drastically. But they're not expected to be enough to offset generally lower prices, and still-increasing production costs.

Crop production, which governs amount of farm chemicals used, is to be another record or near-record in 1953 . . . weather permitting.

Farm use of fertilizer and lime likely will continue at about 1952 levels, despite somewhat lower incomes forecast.

Pesticide use on crops and livestock may again be at relatively low levels . . . depending of course on insect infestation.

Feeling on farms as the production season approaches is that insect-infestations this year very likely will be about like 1952.

The passive feeling of farmers is loaded with dynamite for farmers themselves, crops and the chemical industry.

A big pest year could come. But it's still too early to say, according to entomologists. A big pest year likely would find many farmers without pesticides and distribution channels would be disrupted.

Fertilizer use on cotton likely will be somewhat less this year if farmers follow the government's suggestion that they plant almost four million acres less to this crop.

Pesticide use on cotton also probably will be off. Unofficial estimates on

pesticide use on cotton give you an idea of what to expect for 1953:

In 1950 usage of cotton was roughly 500 million pounds on field strength dust basis.

In 1951 use went up 100-200 million pounds over the previous year's use.

In 1952 estimates indicate considerable pesticides were used, but under 1950 application.

In 1953, it is expected to be off last year's unofficial estimated use.

Note—25 per cent of all pesticides used every year goes on cotton. This crop is the big variable of the total pesticide market.

Manufacturers and dealers of farm machinery, other equipment are being brought in on fertilizer and lime utilization program. Federal and state officials are engaging in a broad campaign to alert these groups to benefits possible in such a campaign.

Officials say eventually the campaign will result in greater demand for fertilizer-spreading equipment . . . and later a demand for new machines embodying improved application techniques.

Utilization program is being developed and organized on state level through Land Grant Colleges, Experiment Stations and Extension Service. These are contact agencies for groups interested in the program. They'll run the show.

Lime industry is confronted with basic market problem: How to get along without support of the Agricultural Conservation (payment) Program.

Lime use on farms is closely tied up with government payments to farmers for conservation practices. In 1951, ACP payments for lime applications totaled $3.1 million . . . 17 per cent of all payments made in that year.

Current trend toward payment only for so-called permanent practices may cut out subsidies to farmers for lime and fertilizer applications.

Lime situation is different from that of fertilizer. Farmers can see almost immediate results from fertilizer use.

But full benefits from lime may not be visible for two to three years . . . although results extend over a period of five to seven years.

Actually, many conservationists insist lime usage is a major conservation practice in many areas of the country . . . and should be treated as such.

Lime may be confronted by still another problem . . . the trend toward ordering soil tests as a prerequisite for receiving ACP payments. This tends to discourage lime use . . . too much trouble involved in getting soil tests done.

Don't look for strengthening of prices of basic chemicals toxaphene, aldrin and DDT much before the spring crop production season begins.

Heavy stocks in hands of formulators generally is the reason formulators are not snapping up the basic chemicals at lower prices.

Just how much the spring thaw will loosen heavy inventories no one in Washington will suggest.

First big farmer buying of insecticides usually comes for fruit . . . when the buds begin to open. That's about May 1 in Shenandoah Valley. Lots of DDT should move then, lots of lead arsenate, sulfur, and some newer fungicides.

Then . . . trucks farmers start applying, then too the cotton growers for early applications.

Watch for Secretary of Agriculture Benson to shoot from the hip . . . fast, with little advance notice. Changes in USDA organization are to be handled swiftly.

Reason for fast action is to allow for little opportunity for objection, road blocking. The Secretary has broad powers for this sort of thing by law, and is expected to shake the USDA into the shape he believes it ought to be.

Power of PMA (Production & Marketing Administration) is to be sharply cut . . . especially its power to disburse $250 million in conservation payments. This power likely will be handed the states, which probably will be somewhat more strict in the handling of the funds.

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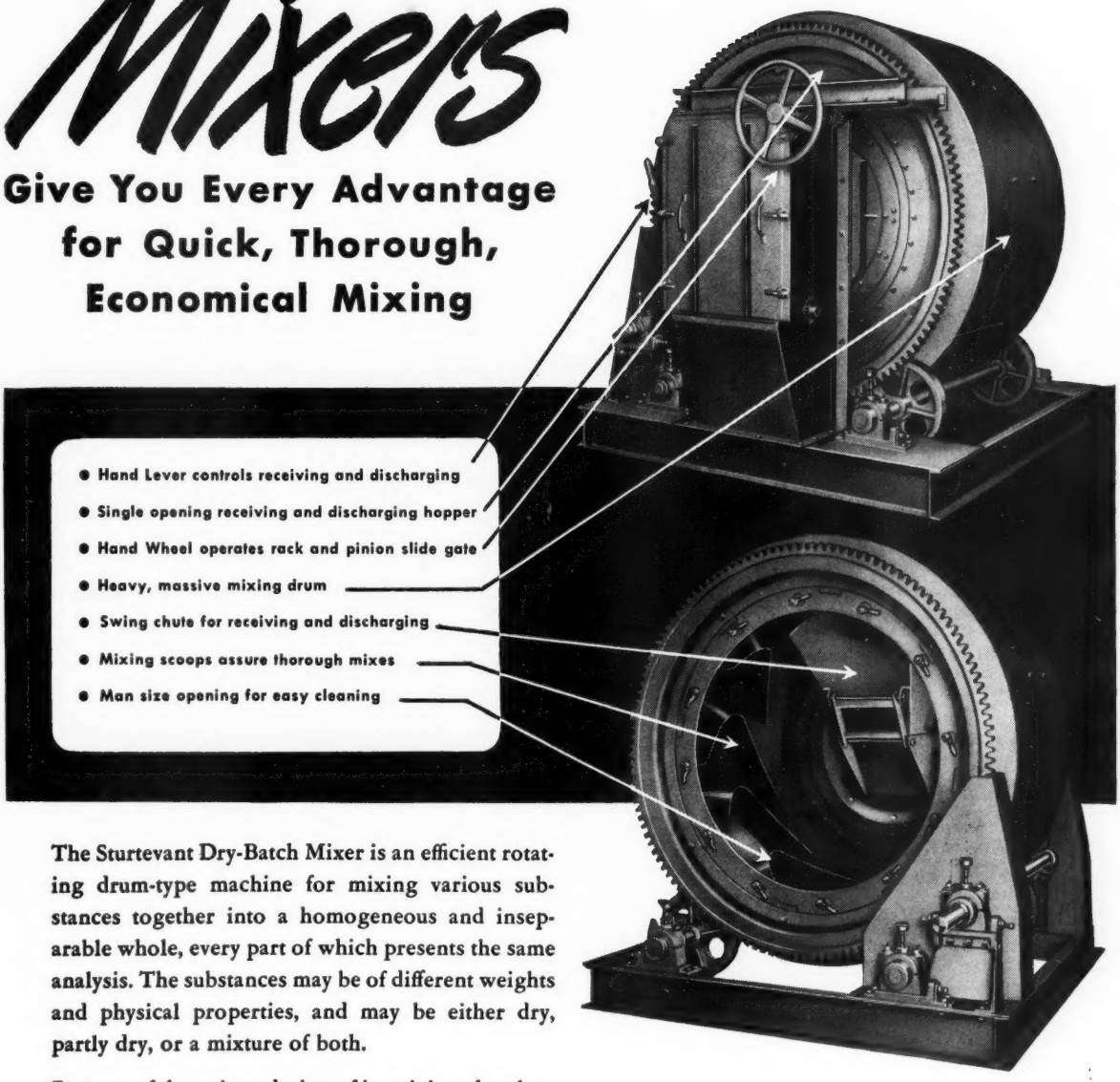
• Hand Lever controls receiving and discharging
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• Man size opening for easy cleaning

The Sturtevant Dry-Batch Mixer is an efficient rotating drum-type machine for mixing various substances together into a homogeneous and inseparable whole, every part of which presents the same analysis. The substances may be of different weights and physical properties, and may be either dry, partly dry, or a mixture of both.

Because of the unique design of its mixing chamber, and the 4-way mixing action which brings two or more substances together, the Sturtevant Dry-Batch Mixer does a more rapid mixing job than other machines and, at the same time, it is complete and thorough in every particular.

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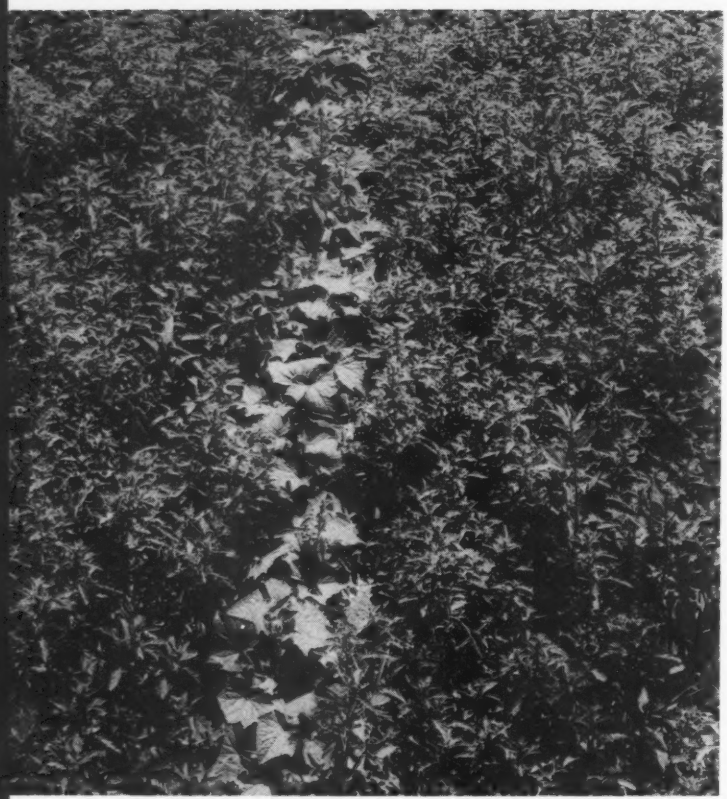
MECHANICAL DENS and EXCAVATORS

Compare These Advantages

- Only one lever controls both receiving and discharging for simplicity of operation. Hand wheel operates rack and pinion slide at feed opening.
- 4-way mixing action speeds production...assures thorough blends.
- "Open-door" accessibility permits easy, fast, thorough, cleaning.
- Single aperture drum for both intake and discharge.
- Unusually efficient scoops pick up materials to effect thorough mixing as drum revolves.
- 5 models . . . a size for every mixing job . . . smallest size mixes up to 7½ tons per hour . . . largest size up to 75 tons per hour.



This row of untreated young cucumber plants has nearly been choked out by weeds in plot at Eastern Breeding Station, Associated Seed Growers, Inc., Orange, Conn.

Another row of the cucumbers, treated with Alanap herbicide immediately after they were planted, is free of weeds.

U. S. Rubber's Alanap:

It Kills Weeds Before They Sprout

WEED KILLERS have come a long way in just a few years of development. Ever since 2,4-D was marketed widespread interest has been given to research on chemicals which would do a better and more efficient job of keeping crops free of weeds.

One important development in the young field was the research reported in 1949 by Hoffman and Smith in which they described a group of growth regulating chemicals termed the N-aryl phthalamic acids.

Many related compounds have been prepared since then.

Most Outstanding Chemical

Probably the most outstanding chemical of the group is N-1 naphthyl phthalamic acid. It is a selective herbicide which has two advantages: it can be applied as a spray to the soil or as a contact herbicide.

For maximum control the chemical is applied to the prepared soil surface immediately or a short time after the crop is planted. It has little or no effect on emerged weed seedlings so application must be made before the weed seeds germinate.

This chemical, which was tested extensively during the past two years, was developed by Naugatuck Chemical Division of United States Rubber Co. It's called Alanap.

Most of the importance of Alanap, of course, is attached to its use as a pre-emergence weed killer—its effectiveness on weeds before they become healthy growing plants.

But it has another significant feature. Alanap can be used safely on many truck garden crops, which has not been the case with the earlier 2,4-D because it was highly injurious to crops.

Aside from its agricultural value, Alanap has shown itself to be a possible boon to home owners, for the herbicide is highly destructive to crab grass while having no effect on established lawn grasses. Treatment of a lawn in late May or early June, just before the crabgrass sprouts, will protect the lawn from the inroads of the weed.

Wettable Powder

The chemical was supplied to experimenters as a wettable powder containing 90 per cent active ingredient. Further formulation work is in progress, Naugatuck states, which may indicate modifications in this basic powder.

Alanap is easy to apply. Standard spray equipment delivering 25 to 100 gallons per acre can be used to apply it as a broadcast spray.

After application, the weed killer has a long period of effectiveness. Although length of time the chemical is retained in the soil depends upon soil moisture, type, temperature and organic content, tests have shown that four to six pounds per acre of actual treated surface gives good weed control for a period of from three to eight weeks.

In addition heavy rains falling immediately after applying Alanap have not reduced its effectiveness, tests indicate.

On the matter of toxicity, preliminary work indicates Alanap has low toxicity to warm-blooded animals. No adverse effects were observed in handling large quantities of the chemical both in the laboratory and in the field. The company says extensive toxicological studies now are in progress.

Used on Vine Crops

Tests with Alanap at many agricultural experiment stations have shown some interesting results. Excellent results have been obtained in tests with such crops as cucumbers, cantaloupes, watermelons, pumpkins, squash, asparagus, snap beans, soybeans, peanuts, sweet potatoes, peppers, carrots and onions. Naugatuck reports also that tests have been promising on nursery stock and cotton.

On vine crops, Dr. G. F. Warren, associate professor of horticulture at Purdue University Experiment Station, has found the new Naugatuck herbicide to be particularly effective. He found that muskmelons, cucumbers and watermelons showed good tolerance to both pre- and post-emergence applications of Alanap. In field experiments Dr. Warren obtained excellent control of germinating crabgrass with an application of Alanap at the rate of four pounds to the acre. He added that there was no adverse effect on the yield or maturity of the muskmelons.

Tangible proof of the value of the pre-emergence weed killer was given by Associated Seed Growers of Milford, Conn. The company reported it saved approximately $150 per acre by eliminating hand weeding.

Similarly, excellent results have been obtained at other experiment stations on various crops.

Pre-Emergence Control

It has been found that Alanap is more effective as a pre-emergence than as a post-emergence weed control. Most effective results are obtained when the chemical is applied at planting time or within a day or two thereafter. Effective dosages range from four to eight pounds per acre for a broadcast spray. When applied as a band on the row one to three pounds per acre generally are sufficient for good control.

With such a good start, the farm chemicals industry can expect much in the next few years from Naugatuck's Alanap. ◆

Technical Data On Alanap

U. S. Rubber has just announced Alanap will be available during the 1953 growing season for use on vine crops only.

Following is a summary of technical data on the herbicide:

Chemical name: N-1 naphthyl phthalamic acid.

Compatibility: no tests to date.

Toxicity: low to warm-blooded animals.

Formulations: wettable powder containing 90 per cent active ingredient. Further formulation work is in progress.

Alanap was developed at Naugatuck Chemical Division of U.S. Rubber. Pictured below are offices, lab, greenhouse and library of the division.

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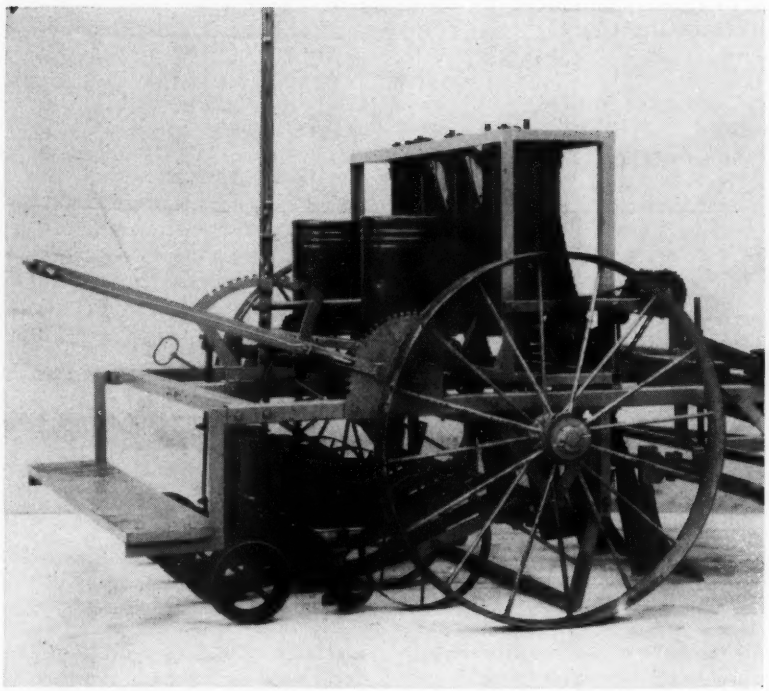


Pictured here is the Universal Vegetable Drill developed by USDA at Beltsville, Md. headquarters for experiments in fertilizer placement.

Rube Goldberg didn't invent them— the USDA has been developing these machines to determine best ways of

Placing Fertilizer

MUCH has been written in the past few years about experiments to determine the most advantageous placement of fertilizer to obtain best results from crops.

Methods of application, broadcasting and banding and depth of placement have been widely discussed. The development of radioactive phosphate shortly after World War II stimulated this research by enabling scientists to use the material as phosphate fertilizer and thus measure accurately the uptake from the material placed in the soil and the utilization by the crop.

Comparatively little, however, has been written about the delicate and uniquely contrived machinery developed to carry out these experiments, yet the machinery is an integral part of all such research.

Placement Machines

Fertilizer placement machines of all types have been designed by agricultural engineers of the USDA. During the past 20 years the Department reports more than 40 experimental machines, each of distinctive design, have been developed. They have been put to wide use: nearly 800 fertilizer placement experiments have been conducted with 41 crops in nearly half the states. They usually are attached to an ordinary tractor.

Importance of the machines to our farm economy is indicated in this statement from the USDA: the equipment, when used to determine precise placement as compared with broadcasting of plant foods, has contributed to a 20 per cent increase in yields obtained experimentally with corn, cotton, potatoes and tobacco.

Even more striking are the results obtained in 12 typical experiments with different vegetable crops in western Washington, where localized side placement of fertilizer increased yields an average of 47 per cent.

Improved Equipment

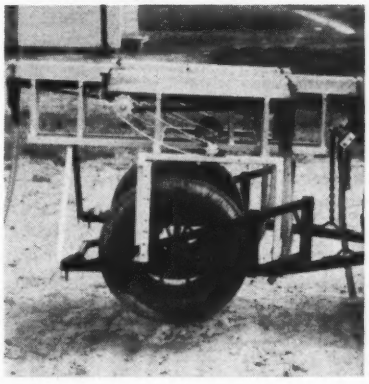
In addition the machines have led to the development of superior designs for chemical fertilizer application equipment now being used by farmers all over the country.

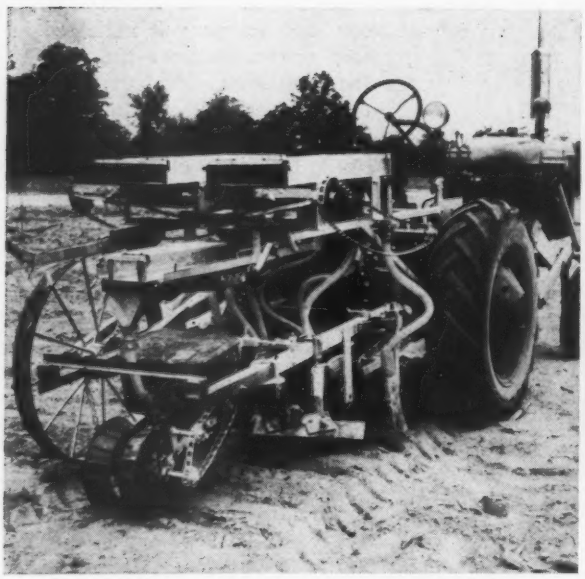
One such machine was developed recently by agricultural engineers in the USDA and the North Carolina Experiment Station. An excellent description of the fascinating development of the machine and some of the results obtained with it are given in a booklet called "Differential Fertilizer Placement Machine," issued by the Department of Agricultural Engineering at the station. It was prepared by James H. Anderson, research instructor at N.C. State College; W. C. Hulbert, associate agricultural engineer, USDA and E. N. Scarborough and R. W. Wilson, research assistant professors at the college.

Partial text of the booklet follows:

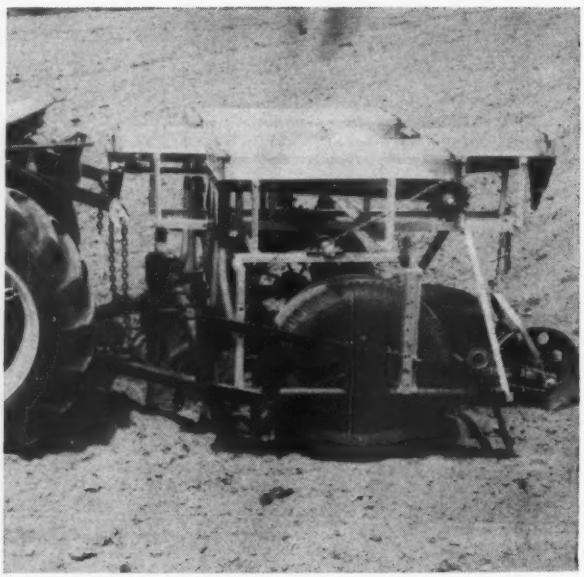
Because the cost of fertilizer represents a large portion of the total production cost of such crops

Special radioactive fertilizer attachment mounted on Farmall tractor.





Fertilizer placement attachment on a Farmall A. tractor at the Rowland Farm 20 miles south of Raleigh, N. C.



Differential placement machine for radioactive phosphorus built by USDA and N. C. State College in 1949.

as cotton, corn and tobacco, it is imperative that research be carried out to determine the best rate and placement of fertilizer. The placement machine described here was developed as an aid for carrying out this needed research.

Band Placement

The present recommendations for fertilizer application for most row crops in the South are band placement of a complete fertilizer at the time of planting and a side dressing of nitrogen and possibly potash at a later date. The band placement is recommended for the following main reasons:

1. Restricted contact of fertilizer with soil lessens fixation of phosphate and potash. Reducing contact and fixation prolongs the period of availability of these elements for plant growth and consequently increases the percentage of uptake of the amount of fertilizer applied.

2. Supplemental plant food is placed within easy reach of plant roots and if the proper placement is accurately controlled the possibility of injurious concentrations is minimized.

3. Fertilizer placed in a band along the row does not readily furnish nutrients to weeds growing between the row. Also, localized application too far from the seed or roots can result in retarded growth until the roots reach plant food.

Preliminary studies in North Carolina of the effect of time and placement of fertilizer on the production of field crops indicate that the greatest fertilizer efficiency will not be obtained when all of the plant food elements are placed in the conventional band method.

These indications also have been noted in other states. However, at the present time, scientists have not made as rapid progress as desired in determining the ideal location for the time and placement of each element. This is attributed largely to lack of better research tools. It is believed that more satisfying progress can be made with the following approach:

1. Through band application using new methods (such as the tracer technique with radioactive phosphate) on individual plants the root pattern can be established within limits.

2. The best combinations of rate and placement based upon the root study made above will be tested on field plots using the "Differential Fertilizer Placement Machine" described in this circular.

3. Specifications will be set up and a commercial fertilizer distributor will be designed to meet the new placement recommendations.

First Model

At first, in all plant studies with radioactive phosphate, the material was placed in the soil by hand methods. But in a short time the great need for mechanical means of placing the radioactive material in a uniform and accurate manner, was realized.

It was necessary also to set up field operations comparable to those of standard farm machines.

Based on this need, particularly for the studies being carried on in North Carolina, the U. S. Department of Agriculture in 1948 devised a side dressing machine with a special fertilizer hopper which safely handled the radioactive phosphate. With this preliminary work of a single season as a background, the planning of a differential fertilizer placement machine was begun. In conjunction with the development of these two special machines was the improvement of the USDA "Radioactive Phosphate Fertilizer hopper."

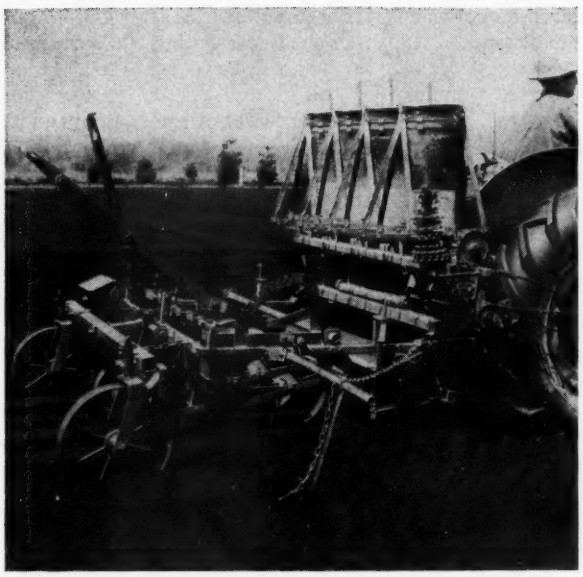
This type hopper has proved satisfactory and since has been used on a number of experimental fertilizer machines at a number of state experiment stations.

Requirements for Machine

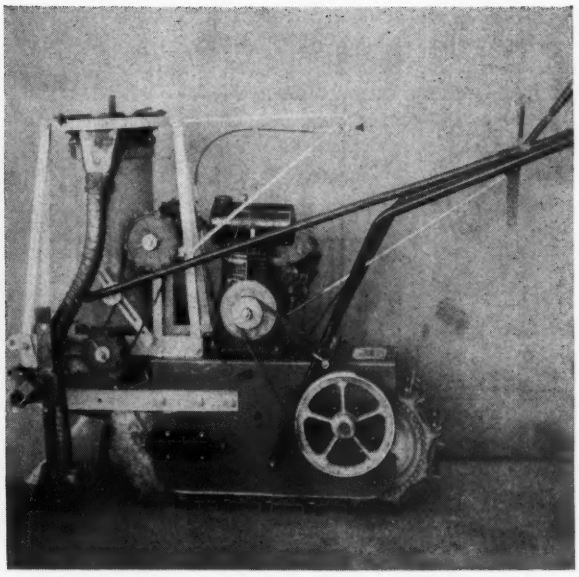
In collaboration with agronomists the following requirements for a differential placement machine were set up:

1. Place one, two or three bands on one or both sides of seed row at a distance of three, nine or 15 inches laterally, and at depths from three to five inches.

2. Place nitrogen and potassium



Placement equipment at East Lansing, Mich. is used for planting sugar beets and placing fertilizer along rows.



Special fertilizer attachment and vine lifter on single track garden tractor for fertilizer side dressing studies.

in bands three inches on each side of seed row three inches deep.

3. Mix fertilizer in a soil zone six inches wide, three inches deep, "down the row."

4. Place fertilizer directly with the seed when planting.

5. Be capable of mounting the following attachments: a. Shovel for opening rows. b. Hilling disks or leveling wings for bed forming or smoothing seed bed after fertilizer has been deposited. c. One row planter for row crops.

6. Combinations of any of preceding.

To meet the preceding general specifications, a mounted machine was built on a four-wheel cultivating type tractor (Farmall Super A make). This machine utilized the two-way hydraulic lift system of the tractor to set it at prescribed depths of operation as well as to lift it for transporting. (See photo page 16).

The machine had several advantages, namely; it was maneuverable in the field, compact and rigid in construction and easy to transport.

Although favorable in these respects the machine was not adaptable to fields or irregular surface. A great number of the experiments were placed on outlying areas in 1949 and the irregularities of these farm fields gave considerable difficulty in the placement applications on these farm fields.

The ground irregularities also gave difficulties with the drive wheel for the hoppers. Because of these difficulties, members of the various research groups agreed on a plan to revert to the two-wheel trail type machines.

Second Model

Functionally, the new model built in 1950 was the same as the previous, but by means of different methods of control and operation, the uniformity and character of the work done was improved, especially on plots with irregular ground surfaces.

The principal changes and features of the new machine are given in the following paragraphs. As indicated in the previous discussion, the new machine was designed as a trailing type machine. When the machine is in operation, the frame is held in a fixed vertical position by two pneumatic wheels which also act as drive wheels for the fertilizer hoppers. The wheels were placed at mid-point between fertilizer and seed soil tools (lengthwise of machine) in order to minimize the effect of irregular soil on placement and planting operations.

The means of pulling the machine consist of a central tongue that is attached to the tractor under the engine on a ball-socket hitch which permits vertical as well as lateral motion without binding. The machine is lifted and transported by means of two crop chains on the tractor's rock arms of the hydraulic lift system to the main frame of the machine. Two large bumpers on each side of the tongue prevent side interference of the frame with the rear tractor wheels as well as holding the machine in a somewhat fixed position when in transport position.

Special Frame

A parallelogram hinged framing of the tool bar allows the depth of the soil tools to be regulated by means of a lever fixed to set at prescribed depths. Greater flexibility of placement of fertilizer is permitted by having both vertical and horizontal positions of the soil tools adjustable on the tool bar. Both shovel and disk openers were adapted to the tool bar clamps.

The top-delivery hopper was removed in that the agronomists felt N and K can be metered by means of the inner cells of the large belt hoppers and thereby do away with the extra hopper. The use of the small hopper was confined (as to use) to the "with seed" application of fertilizer and its previous other use of "down the row" application was replaced by a 36" x 6" hopper mounted between the two triple cell hoppers.

In order to minimize fertilizer tube length and at the same time shorten the overall operating length of the machine, the planter attachment was mounted as near under the small hopper as possible.

For accurate placement of fer-

tilizer, metering fertilizer accurately and uniformly is an important allied operation. The usual method employed with this machine is to determine the exact amount of fertilizer required to give a desired rate of application for a plot length row, either by calculation or by charts. This measured material then is spread in a uniform cross section the length of belt that traverses around the rollers while the machine travels the full length of the plot.

Belt Length

To stress the importance of matching the length of belt travel to the plot length, it may be worth while to note the effect when fertilizer is spread one inch short of the belt length of travel. Because the usable surface of the belts in the large hoppers is about 24", a 1" length variance automatically enters about five per cent error in the desired rate of application as well as having five per cent of the length of the plot row with practically no fertilizer.

Results of this research will help determine the specifications for the development of an improved commercial fertilizer distributor.

The present model has proved satisfactory for research on cotton, corn, tobacco and small grain. It also will be used on peanuts, soybeans and the various vegetable crops.

Another machine, designed for fertilizer placement drill in organic soil investigations, was developed at Michigan State College, in conjunction with the USDA.

The drill was designed for experimentation with the various row crops grown on much soils. It includes four top-delivery fertilizer hoppers and utilizes the hydraulic lift of a two plow rubber-tired wheel tractor for raising and lowering the seeding equipment. This integral attachment makes possible turns in shorter areas than can be obtained with trailer-type machine. (See photo page 17.)

Operation Successful

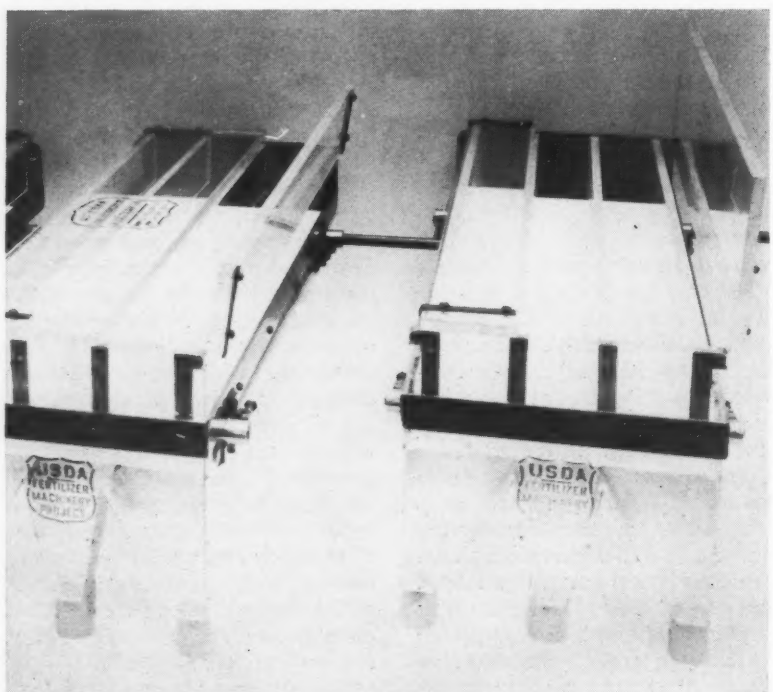
The operation of the machine has been generally satisfactory within the limits encountered in the experimental program. A 13-inch roller fabricated from 14 gage material is used as a leveling device. Spring tension arms make it possible to vary the pressure of this roller with different soil conditions. In order to eliminate any trouble from much pushing ahead of the roller, a clutch assembly similar to the one for driving the fertilizer hoppers was constructed.

This assembly is mounted on the left rear wheel of the tractor and a V-belt is used to drive the roller. However, no soil condition was encountered in 1948 that required the use of this drive. The machine has been in operation since 1947.

During this period, onions, head lettuce, carrots, table beets, sugar beets, cabbage, brussels sprouts, broccoli, parsnips, chickory, peas and soy beans were planted with this equipment. This machine can also be used for side-dressing by removing the seed units and roller. Mint, celery and onions were side-dressed during the 1947 and 1948 seasons with this equipment. Interplanted grains for wind control may be seeded at the time of planting by supplying additional seeding units.

In other experiments at the Michigan Agricultural Experiment Station, it was necessary to develop a machine which would satisfactorily apply fertilizer at any stage of plant growth, because in many experiments part of the plant food is applied after the crop has attained considerable growth. Fertilizer placement equipment on tractors obviously can't do the job without causing serious injury to the stand.

View of belt fertilizer hoppers constructed for Iowa study with grains. Hoppers are 12 by 36 inches. Each has three cells and plastic lids.



Use Garden Tractor

Selected for the mobile power unit was a crawler-type single-track garden tractor. A rotating, top-delivery hopper was mounted on the front of the tractor and was driven from the axle shaft of the driver sprocket which carried the track. Rates of application could readily be varied by the use of alternate sprockets at four points. (See photo place 17.)

This equipment has been satisfactorily used in corn, mint, onions and celery, both on mineral and organic soils with row spacings ranging from 14 to 40 inches.

The single track-type garden tractor made it possible for the machine to operate between two rows without injury to tall plants, and the track was wide enough to make the machine fairly stable. When stopped it would remain upright without a special rest or assistance from the operator. ◆

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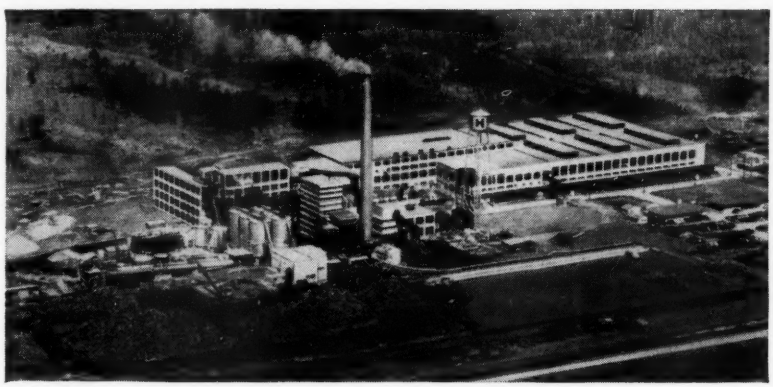

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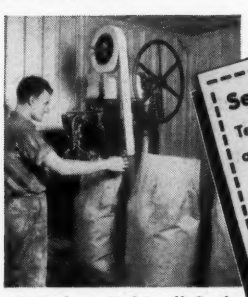

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T. H. Mittendorf

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Loading granular insecticide materials into plane for spraying over crop land. Airplane application has been good on difficult terrain.

Labeling, Application problems met by using

Granular Insecticides Mixed With Fertilizer

By M. D. Farrar
Entomologist, South Carolina Experiment Station

APPLICATION of insecticides to crop land by spraying or dusting has not been found satisfactory. A large portion of the chemical always is lost through drift. To overcome this difficulty granular formulations of insecticides have been developed. With this formulation the correct amount of chemical may be applied with a minimum loss in material.

There have been many effective methods of control developed for those insects that feed on the parts of plants growing above the ground. Many of the most destructive insects, however, feed for at least a part of their life cycle on those parts of plants growing below the soil surface.

Possible Solution

Now there is a possible solution to the problem of controlling insects feeding below the soil surface. This has been brought about by the discovery of the new organic insecticides.

Entomologists now are reappraising the control of insects that spend a part of their life cycle in the soil. With the new insecticide chemicals it has been demonstrated that the soil infesting insects can be controlled. This control has been followed by a marked improvement in the growing crop.

The mixing of insecticides with fertilizers has been an excellent medium, without undue loss, of placing insecticides in the soil. Although mechanically satisfactory, the mixture has been unpopular for many reasons. Among these are the difficulties of administering the fertilizer laws covering grades and registration, labeling and manufacture and the distribution of the required mixtures.

Certain states have prohibited mixing of insecticides with fertilizers; others will permit the manufacture and sale of such a mixture provided a special tag is attached to each bag. In spite of these handicaps, thousands of tons of fertilizer-insecticide mixtures have been manufactured and sold.

Granular Insecticides

Granular insecticide formulations have been developed to meet this problem. With this type of insecticide available farmers can purchase an insecticide for use on soil in a bag carrying a registered insecticide label. This can be applied either alone or with fertilizers in any proportion that is considered desirable.

Amount of insecticide and method of application depend on the kind of insects and dosage recommended.

There are available from the manufacturers inerts sold to extend insecticides, coarse grades which have been marketed for other purposes. Among these is a grade ranging from 30 to 60 mesh size. Experimental formulations indicated that insecticides could be mixed with granular inerts by the same procedures used in the manufacture of dust base concentrates.

Experience has shown there are many materials which may be used as a base for a granular insecticide. Among these are common clays, highly absorptive clays, bentonite, tobacco by-products and perhaps many others.

Selection of the proper base depends on what may be required of the finished product, how it is to be applied and other related factors. Amount of chemical toxicant absorbed by a granular inert will depend on the physical properties of each inert.

Exceeding the limit of absorption may produce a non-free flowing product. The lower economic limit of toxicants is approximately five per cent with an upper limit of approximately 50 per cent. Good working percentages range between five and 25 per cent of toxicant to the inert carrier or base.

Distribution Pattern

Distribution pattern of a granular type insecticide will depend on the physical properties of the inert. In the following paragraphs size of the particles termed granular inert are those which pass through a 30-mesh screen, but are held on a 60-mesh screen, termed 30/60 grade.

Size of each particle within this range will influence total number of particles in a pound. It has been

calculated that a typical pound sample of 30/60 attaclay contains 13,500,000 particles. When equally scattered over an acre, each square foot would average 300 particles, a single square inch 2 plus particles.

When calculated against applications of 5, 10 and 15 pounds per acre the particles would be scattered at 10, 20 and 30 per square inch respectively. Individual particles would be about 2/10 inch apart when distributed at 30 per square inch.

It may be assumed that as the total pounds of granular insecticides are increased per acre the individual particles will fall closer together. In the manufacture of granular insecticides the total amount of inert base is impregnated with the insecticide.

By reasons of the laws of chance, each particle should carry an amount of toxicant in proportion to the size and distribution of that particle within the total mass. When scattered on the soil, as the number of particles are increased per unit of area, the toxicant likewise would have the same degree of distribution.

In two cases where one pound of technical heptachlor was applied per acre, certain Florida data gave a 96 per cent kill of sand fly larvae following an application of five per cent granular heptachlor at 20 pounds per acre. In comparison only a 93 per cent kill was obtained following an application of 10 per cent granular heptachlor at 10 pounds per acre.

Amount Important

The amount of insecticide or toxicant that a granular inert will absorb has an important bearing on the formulation. This factor may vary between five and 50 per cent by weight. The objective is to have a finished product which will be free flowing without agitation.

The bulk-weight density of granular inerts may cover a wide range. In tests the most bulky product formulated is a by-product of tobacco manufacture. When formulated at five per cent concentration of toxicant it flowed easily and could be handled by all types of equipment. Granular attaclay and similar inerts will absorb up to 25 per cent of certain insecticides.

Bentonite has the lowest absorption property of those inerts tested ranging around five per cent. With the exception of granular tobacco by-products all of the formulations tested have a tendency to pack.

In the manufacture of granular insecticides the valve packing equipment commonly used for dusts will fail if the finished products exhibit a property of packing. This property also restricts to a certain extent the type of equipment used for distribution. The addition of a

M. D. Farrar

chemical to induce a flow property may correct the difficulty.

A satisfactory base for a granular insecticide should be close-screened for uniformity. An excess of fines will make a dusty formulation that defeats, in part, an important property of granular mixtures. A well formulated mixture will be free flowing and essentially free from dust. Such a mixture when applied will show little tendency to drift, the particles falling directly to the soil. When scattered from altitudes exceeding 100 feet some formulations may drift slightly with the wind.

Airplane Application

Application from an airplane has been very satisfactory over difficult terrain, where the airplane is virtually the only economical method of applying insecticides. For this purpose a high concentration of toxicant is desirable in order to increase the pay load. Amounts of 10 pounds per acre have been successfully broadcast from the air.

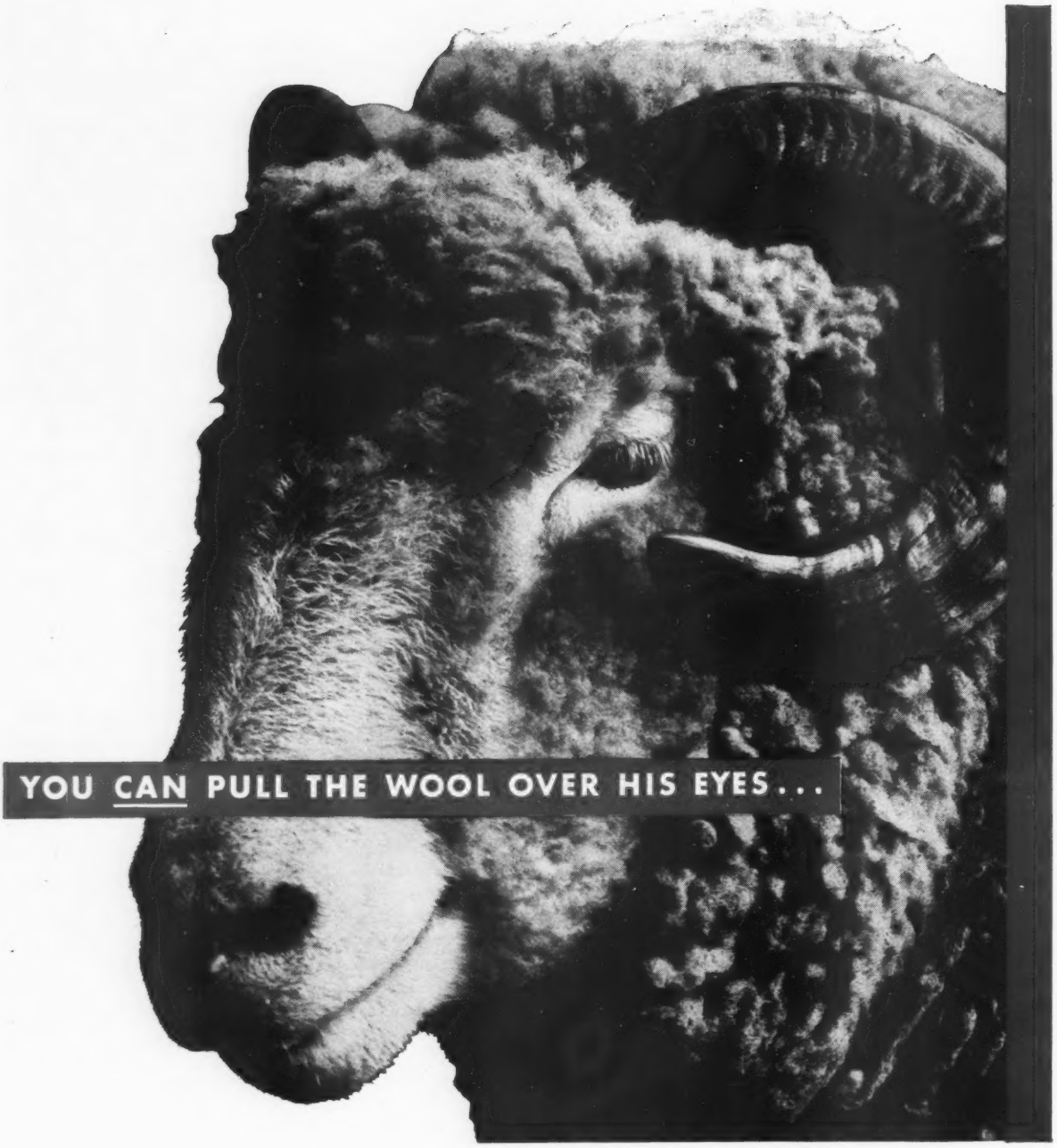
Only experimental flights of the granular formulations will determine distribution pattern for each type. The heavier bulk density mixtures will give the lesser width of swath covered. In experiments a bentonite formulation flown at 70 feet covered a swath of 27 feet, an attaclay formulation flown at 80 feet covered a swath width of 85 feet and a tobacco by-product formulation flown at 100 feet covered a swath width exceeding 100 feet.

With a Stearman plane experience has shown the type of pattern which may be expected from a 16 per cent dieldrin formulated into 30/60 attaclay. Experimental runs indicated that flying at crop dusting height this granular insecticide was scattered for the width of the wings or 42 feet. When flown from 80 feet, 85 feet of swath width was obtained.

For perfect coverage of the soil the plane was flown at 85 to 100 feet of altitude following the usual wing width pattern of flight. A flagman stationed at both ends of

(Continued on page 72)

Another view of preparations for air application of granular insecticides which effectively control the problem of drift caused by wind.



When the fleece on the flock is long and heavy the rancher knows that his efforts will pay off in profits. Prime stock is fed prime feed to assure good meat, good wool—good prices.

While man supplies labor and knowledge, it's the soil that supplies the strength responsible for the growth of all living things. For from the soil come the vital plant-food elements that nourish all life. And to the soil these elements must be returned.

Many of the most effective soil-replenishing fertilizers contain POTASH, often Sunshine State Potash, a product of New Mexico. For Potash helps nourish the soil with active ingredients that make for bumper crops and healthy flocks. In every way Potash proves a valuable profit-producing aid to a healthy state of business.

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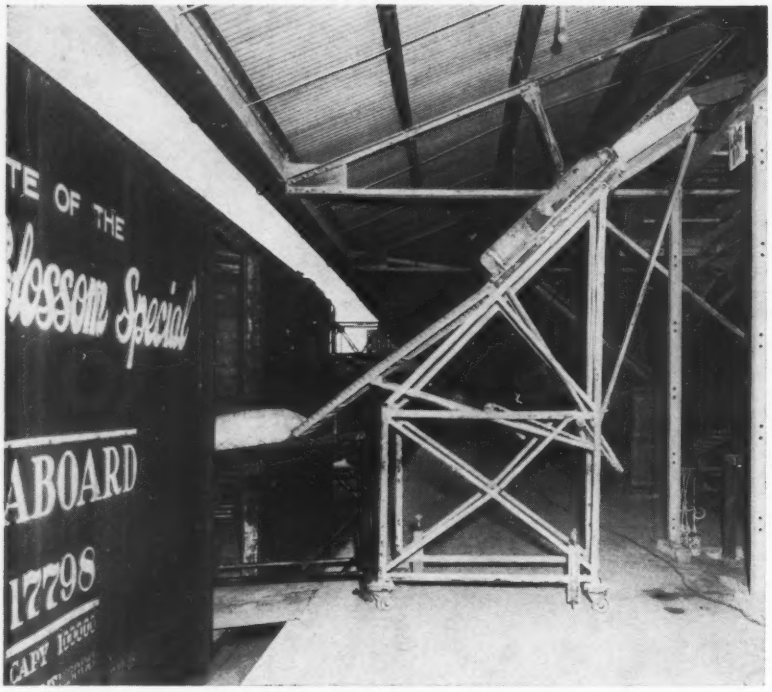


Bags of fertilizer are loaded into freight car in this section of the bag loading conveyor system at Southern Fert's Hutchinson Island Plant.

Can your company match the advance of Southern Fert?

Southern Fertilizer & Chemical:

A Story of Progress

By Hamilton C. Carson
Managing Editor

WHEN Southern Fertilizer & Chemical Co. started an extensive modernization and mechanization program in 1946, nobody who is familiar with the company was greatly surprised.

Likewise when the company started manufacture and distribution of pelletized mixed fertilizers last year no eyebrows were raised.

The reason is simple: progress is old stuff at Southern.

Ever since 1905, when A. D. Strobhar, Murray Stewart and J. J. Rauers organized the company it has been moving forward, keeping abreast of every new development in the fertilizer industry with an enthusiasm and vigor that belies Southern's familiar (but now somewhat incomplete) trademark—the name "Southern" superimposed on a picture of a fish.

Next modernization step planned by Southern is construction of a plant for production of phosphoric acid at the company's Hutchinson Island (Atlanta, Ga.) facilities, needed in the manufacture of high analysis fertilizers for farmers in the Southeast.

But let's trace the story from 1905.

In association with Strobhar (who still is president), Stewart and Rauers when the company was incorporated was the cotton manufacturing firm of Canon & Barnwell. W. Dewey Cooke (now vice president, secretary and treasurer) joined the firm 10 years later.

First unit at Southern was a dry mixing plant located in warehouse space leased from Seaboard Air Line Railroad on Hutchinson Island.

The company soon outgrew the space and in 1909 constructed its first acidulating plant for the manu-

facture of superphosphate on the island at the location of the present plant.

Sulfuric acid was obtained from Copper Hill, Tenn., until the outbreak of World War I created a shortage of the acid.

Remedying the situation Southern constructed a lead box chamber plant for production of the acid right on the island.

Fire destroyed the original acidulating plant in 1918 but it was replaced immediately by a large crane type plant for making superphosphate and mixed fertilizers. The unit is still in use.

Trademark Registered in 1919

It was in 1919 that the company registered its now familiar trademark. For the next decade it operated a Menhaden Fish Scrap factory at St. Mary's, Ga. Because of a widespread demand for Southern Fish Brand fertilizers it was necessary to extend manufacturing facilities. This was done in 1938 when a dry mixing plant was built in Charlestown, S. C.

This first Charlestown plant was sold and a larger one acquired three years later. Another structure, in Roebuck, S. C., was added to the company's facilities in 1938. An additional plant was acquired in 1941 in Savannah.

Still another plant was purchased by Southern the following year in Atlanta.

The Atlanta plant was a dry mixing unit. Two years later Southern bought a unit for manufacture of super and mixed fertilizers in that city.

As A. D. Brent, vice president in charge of production will tell you, sales of Southern Fish Brand Fertilizers have increased steadily through the years.

Serving Six States

Deliveries are made by the company throughout Georgia and South Carolina and in parts of North Carolina, Florida, Alabama and Tennessee. Export shipments also are made from the Savannah buildings.

The modernization program, started seven years ago, featured equipping of all units with latest types of mechanical handling equipment. Anhydrous ammonia storage facilities and equipment for manufacturing fertilizers with the chemical were installed at the Hutchinson Island site and in the Atlanta plant.

Two years ago the lead box chamber on the island was replaced with the most modern type contact plant for manufacture of 98.5 per cent sulfuric acid.

The far-sighted program of Southern Fertilizer is shown in an important move made in 1950 in conjunction with a small group of associates. The group formed the Stagson Research Corp. at Charlestown, S. C.

Purpose of the corporation will be to benefit all fertilizer manufacturers in the area.

It is designed as a cooperative research effort for making better conditioned higher analysis plant foods for farmers in the area.

Highlight of the company's activities last year was the production of pelletized fertilizers.

But the company, always with an eye to the future, won't stop there.

More Plans for the Future

At present it is installing equipment on Hutchinson Island for manufacture of hydrofluosilicic acid and silicofluorides.

Southern previously had manufactured these chemicals but had discontinued the practice several years ago.

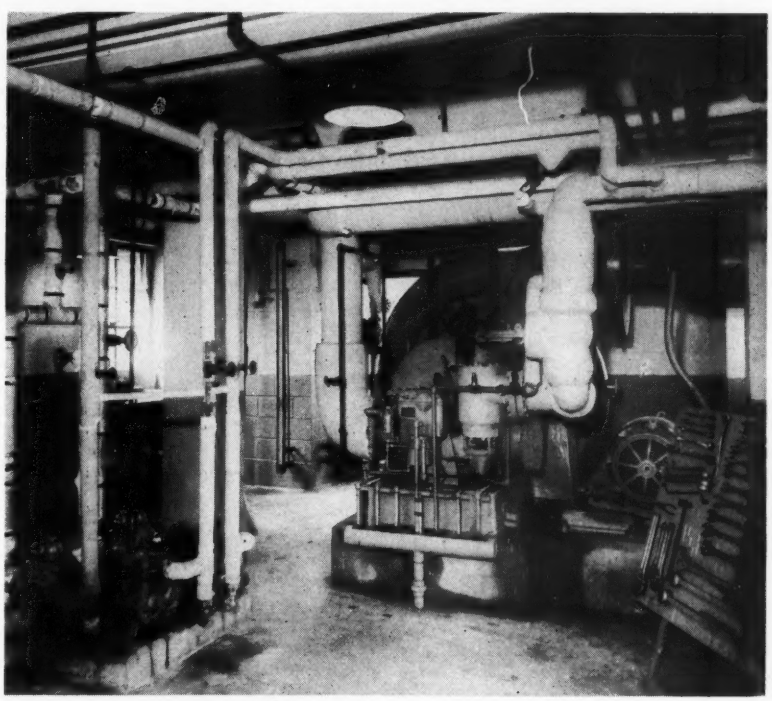
And that brings us up to the plans for construction of a phosphoric acid plant. The acid is needed in Southern's increased emphasis on production of high analysis fertilizers, including grades like 11–48–0 and 16–20–0.

Exporting products is an easy job for the company because Hutchinson Island is adjacent to the Harbor at Savannah.

When Southern Fertilizer & Chemical Co. holds its 47th annual meeting this year officers, in addition to Strobhar, Cooke and Brent will include D. R. Livingston, vice president; W. W. Harley, vice president in charge of sales; H. F. Inglesby, assistant treasurer and H. J. Sutcliffe, assistant secretary.

Serving on the board of directors, along with Strobhar, Cooke and Livingston are J. B. Glover, J. W. Middleton and William H. Stephens. ◆

Photo below shows the machinery room of the contact acid plant at Southern Fertilizer and Chemical Company's modern plant in Savannah, Ga.



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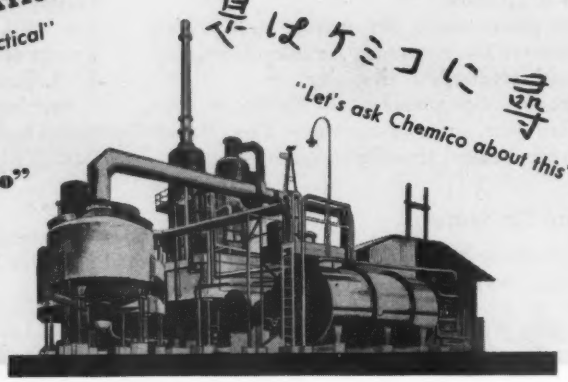

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Mosquito larvacides are tested in lab before application.

Resistance to DDT is combated with organic phosphates

Where DDT Failed—

EPN Kills Mosquitoes

IT LOOKS as though the organic phosphate insecticides may be taking over where the chlorinated hydrocarbons left off—in some cases at least.

That was indicated in a report given at the recent convention of the American Association of Economic Entomologists by Dr. A. W. Lindquist, entomologist at the Oregon experiment station.

Dr. Lindquist presented a paper based on research at the Oregon station which showed the effectiveness of the organic phosphorus insecticide EPN against mosquitoes which had developed resistance to DDT and other chlorinated hydrocarbons.

Not a Replacement

That doesn't mean, of course, that EPN and other pesticides of its type permanently will be replacing DDT in combating insect pests—far from it—but it does indicate one possible solution to the increasingly alarming problem of insect resistance: the substitution, for a time, at least, of one pesticide for another, to give bugs a one-two punch from which resistance can't protect them.

Also effective against mosquito larvae were the organic-phosphate chemicals malathon and NPD (tetra-n-propyl dithio-nopyrophosphate), according to the report to the entomologists.

Dr. Linquist said the latter two chemicals are less dangerous to handle than EPN "but they may not be so economical to use because of the large dosages required."

In the matter of handling, Dr. Lindquist said, periodic blood tests of four men who carried on spraying operations with EPN showed no significant reduction in the cholinesterase level of their red cells or plasma. In addition, no adverse effect was noted in cattle which grazed in one pasture after six successive applications of an EPN emulsion.

In summarizing the findings of the three scientists who conducted the experiments to compare the effectiveness of the three organic phosphate insecticides with DDT, Dr. Lindquist said EPN was found to be most toxic.

The LD-50 for the pesticide for two types of resistant larvae from one sector was 0.000862 and 0.000649 p.p.m. This was 141 and

61 times more toxic respectively than obtained with DDT, he reported.

Effect of Temperature

Temperature increase apparently affects directly the power of the organic phosphates. EPN emulsion was approximately twice as effective and NPD and malathon approximately five times as effective against the mosquito larvae at 90° than at 70° F.

In another phase of the experiments, the entomologist stated, EPN killed 99–100 per cent of mosquitoes when applied from a jeep at 0.035 pound per acre in emulsion or suspension. Malathon and NPD were approximately one-tenth as effective as EPN.

The paper which Dr. Lindquist presented at the convention was prepared by C. M. Gjullin, Lewis W. Isaak and Gordon F. Smith. Gjullin is with the Bureau of Entomology and Plant Quarantine, Isaak with the California Mosquito Control Association and Smith with the Kern Mosquito Abatement District, where some of the tests were conducted.

Assisting in the work was Grafton Campbell, of the Bureau of Vector Control of the California Department of Health.

Text of Paper

Partial text of the paper follows:

The partial or complete failure of DDT and other chlorinated hydrocarbon insecticides against mosquitoes in California, Florida and some other States has become a serious handicap to mosquito-control workers in recent years.

In California resistance has developed rapidly in the San Joaquin Valley, and in 1952 field applications of larvicides at 10 to 15 times the normal dosages failed to control larvae in four mosquito-abatement districts.

The high level of resistance found by Gjullin and Peters (1952) in some species suggests that with continued use chlorinated hydrocarbon insecticides soon will be ineffective against all these species in the San Joaquin Valley.

In 1952 the California Bureau of Vector Control, the Corvallis laboratory of the U.S. Bureau of Entomology and Plant Quarantine, the California Mosquito Control Association and the Kern Mosquito Abatement District carried on a cooperative project in the Kern District to determine the effectiveness of several organic phosphorus insecticides against resistant mosquitoes.

Preliminary tests in the Kern District in the fall of 1951 indicated that EPN might be very effective against resistant mosquitoes. In laboratory tests Yates and Lindquist (1952) found it to be the most toxic material they had ever tested against mosquito larvae. The field tests carried on this season indicate that EPN is

Worker sprays small field plots to test the mosquito larvacides.

an outstanding larvicide against resistant mosquitoes, and that malathon and tetra-n-propyl dithionopyrophosphate (NPD) are effective at higher dosages.

Laboratory Tests

The comparative effectiveness of DDT and the three organic phosphorus insecticides is shown in table 1. On *A. nigromaculis* EPN was 67 times as toxic as DDT, while on *C. tarsalis* it was 171 times as toxic. The LD-50 of EPN on *A. nigromaculis* was 0.000862 p.p.m.

Yates and Lindquist (1952) found it to be 0.00135 p.p.m. on nonresistant floodwater *Aedes*. On *C. tarsalis* both NPD and malathon were more effective than DDT, but on *A. nigromaculis* NPD was slightly less effective than DDT.

Toxicity of the three phosphorus insecticides at different temperatures was tested on *C. tarsalis* larvae (table 2). EPN was approximately twice as effective, malathon approximately four times and NPD five times as effective at 90° as at 70° F. Yates (1950) found DDT more effective at 63° than at 93° on several species of mosquito larvae, as did Lindquist *et al.* (1946) on some species.

Field Tests

Tests against one type larvae were made in areas inundated by the Kern River. The water ranged from a few inches to two feet in depth, and usually was partly covered with grass. Most applications on the other were made in irrigated pastures in open water from one to 10 inches deep, but in some plots the water nearly was covered with grass.

Sprays were applied from a jeep with the hose that is standard equipment on these vehicles. The spray head of the hose was equipped with a No. 3 disc. Pressure ranged from 150 to 200 pounds per square inch. The diluted larvicides were applied at the rate of 10 gallons per acre in all tests. A few applications were made with a 3-gallon hand sprayer.

One series of tests was made with a Stearman plane, flying 90 miles an hour at a height of 25 to 50 feet. Plane applications were made at the rate of 1.2 gallons per acre.

EPN emulsions were made from a 45-per cent concentrate and EPN suspensions from a 25-per cent wettable powder. The NPD emulsion was made from an 85-per cent concentrate and the malathon emulsion from a concentrate containing 5.5 pounds of malathon per gallon.

Jeep applications of EPN at 0.035 pound per acre gave kills of 99 and 100 per cent but higher dosages were required for comparable kills in plane applications (Table 3). This was caused probably by smaller volume of more concentrated spray applied by the plane, by the adverse effects of light winds in some tests and by evaporation of the smaller spray droplets. Malathon and NPD were approximately one-tenth as effective as EPN.

Spraying Operations

The Kern Mosquito Abatement District began routine application of EPN emulsion at 0.075 pound

of EPN per acre with a plane and three jeeps in June after a permit for the experimental use of the insecticide had been granted by the state.

Sixteen more jeep operators began using the chemical in July and during the rest of the season for all control operations except in cities and towns where its use was not covered by state permit. It has given excellent control of larvae in all situations in which it has been applied.

The EPN emulsifiable concentrate is issued in small screw-top bottles which are carried in a compartmented wooden box in the jeep. One bottle contains sufficient EPN for one tank of diluted emulsion.

The operator wears rubber gloves when emptying one of the bottles into the tank, which has been partially filled with water. More water then is added to fill the tank. Instructions for handling the EPN and procedures to be followed in case the skin or clothing was contaminated were issued to all operators.

Several agencies are investigating the toxicity hazard of EPN to warm-blooded animals. Tests by the Food and Drug Administration and others indicate that EPN has about one-fifth the acute oral toxicity of parathion and that the dermal toxicity of the two materials is about the same.

Determination of spray residues on grass has not yet been made, because there is no satisfactory method for recovery of EPN under these conditions. However, no adverse effects have been noted in cattle which have grazed in a pasture sprayed six times at 6- to 10-day intervals with EPN at 0.075 pound per acre.

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YATES, W. W. 1950. Effectof temperature on the insecticidal action of mosquito larvicides. *Mosquito News* 10(4): 202–204.

YATES, W. W., and Arthur W. Lindquist. 1952. Toxicity of EPN, DDT, and parathion to larvae of various species of mosquitoes. *Mosquito News* (in press). ◆

Table 1. Parts per million of some phosphorus and DDT insecticides required to give a 24-hour LD-50 of resistant fourth-instar mosquitoes.

Insecticide	*A. nigromaculis*	*C. tarsalis*
EPN	0.000862	0.000649
NPD	.0625	.0178
Malathon	.025	.0185
DDT	.0588	.111

Table 2. Toxicity of organic phosphorus larvicides to fourth-instars of *Culex tarsalis* at 70° and 90° F.

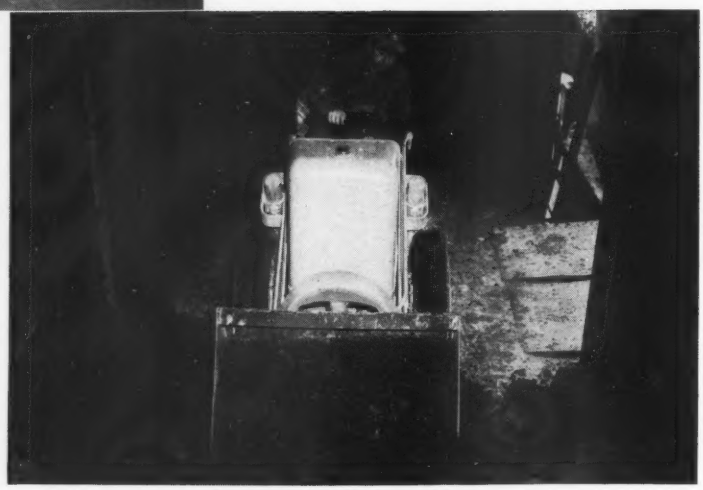
Insecticide	Per cent Mortality in 24 Hours	
p.p.m.	70° F.	90° F.
EPN		
0.00067	57	91
.0005	46	79
.00025	16	48
.0000125	4	24
NPD		
0.033	44	100
.025	17	100
.0167	15	85
Malathon		
0.033	24	85
.025	19	75
.0167	8	40

Table 3. Field tests of organic phosphorus larvicides on fourth instars of *Aedes nigromaculis* and *Culex tarsalis*.

	A. nigromaculis		*C. tarsalis*	
Insecticide	Lbs. active ingred. per acre	Per cent mort. (24 hr.)	Lbs. active ingred. per acre	Per cent mort. (24 hr.)
Airplane Applications				
EPN emulsion	0.045	98	0.045	96
	.035	89	.035	89
	.025	45	.025	57
Jeep Applications				
EPN				
Emulsion	0.035	99	0.035	100
	.025	95	.025	98
	.01	89	.01	97
	..	..	.005	57
Suspension	.035	99	.035	100
	.025	98	.025	100
	.01	55	.01	97
	..	..	.005	70
Malathon emulsion	.4	99	.3	83
	.3	92	.2	97
	.2	83	.1	67
NPD emulsion	.4	93	.3	99
	.3	89	.2	77
	.2	87	.1	76

IN BINS

or BOXCARS



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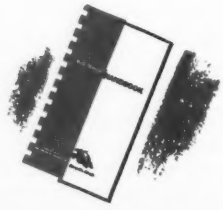

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The St. Gobain Process . . .

How the French make Complex Fertilizers

THE problem of rock phosphate acidulation with nitric acid has been approached in various ways which depend on many factors: the types of formulae required by soils and crops, sulfur or sulfuric acid supply, ammonia and nitric acid supply, phosphoric acid supply, existing facilities, potential marketing areas and funds available.

All these factors have led or will lead the industrialists to adopt either process.

In France, Germany, Holland, Switzerland, Norway, England and America investigations and commercial achievements have been worked out along various lines traced according to government regulations, economic and agricultural conditions on the one hand and the ideas of investigators, the existing facilities and potential market on the other hand.

All the processes involving the use of nitric acid, either alone or mixed with sulfuric or phosphoric acid, may be divided into two groups: solid phase processes giving monocalcium phosphate and liquid phase processes giving dicalcium phosphate.

Solid phase processes giving monocalcium phosphate—In these processes the lime nitrate and eventually the calcium sulfate elaborated by the acidulation are kept in the finished product. Only nitrogen is in the nitrate form.

The process using nitric acid only is operated in Switzerland. It gives water soluble P_2O_5 in the form of monocalcium phosphate. The product is in a very good physical condition and contains lime nitrate, monocalcium phosphate and potash if necessary.

This process entirely eliminates the need for sulfuric acid but the ratio of available P_2O_5 to nitrogen cannot vary very much except in the case of introduction of other elements.

This process necessitates a large amount of stainless steel. It is quite suitable to countries where P_2O_5 must be water-soluble.

The process using nitric and sulfuric acid is commercially operated in France. The ratio of P_2O_5 to N varies from two to four. Further elements can be introduced to give various equilibria. The process is worked out in ordinary superphosphate dens. Generally speaking, the fertilizers produced by processes of this group are not granulated.

This report on granulated nitrophosphate fertilizer process was made available for publication by General Industial Development Corp., of New York City. The St.Gobain process, described in the article, has been in successful operation for the past 11 years on a large industrial scale in several French plants. FARM CHEMICALS *thought its readers would be especially interested in the article, in light of recent similar developments in the United States.*

Liquid phase processes giving dicalcium phosphate—In principle these processes consist theoretically of the following steps:

a. Nitric acidulation of tricalcium phosphate to obtain a lime nitrate-monocalcium phosphate slurry:
$Ca_3(PO_4)_2 + 4\ HNO_3 \longrightarrow Ca(H_2PO_4)_2 + 2\ Ca(NO_3)_2$

b. Ammoniation of the slurry to produce dicalcium phosphate:
$Ca(H_2PO_4)_2 + Ca(NO_3)_2 + 2\ NH_3 \longrightarrow 2\ NH_4NO_3 + 2\ CaHPO_4$
One mole of $Ca(NO_3)_2$ has not reacted however and must be eliminated.

c. $Ca(NO_3)_2$ removal according to the following procedures:
Decomposition by various acids and ammonia—

1. $Ca(NO_3)_2 + CO_2 + H_2O + 2\ NH_3 \longrightarrow CaCO_3 + 2\ NH_4NO_3$
2. $Ca(NO_3)_2 + H_2SO_4 + 2\ NH_3 \longrightarrow CaSO_4 + 2\ NH_4NO_3$
3. $Ca(NO_3)_2 + H_3PO_4 + 2\ NH_3 \longrightarrow CaHPO_4 + 2\ NH_4NO_3$

Decomposition by potassium sulfate—

4. $Ca(NO_3)_2 + K_2SO_4 \longrightarrow CaSO_4 + 2\ KNO_3$

Precipitation (alone or as a double salt) and filtration—

5. $Ca(NO_3)_2 + K_2SO_4 \longrightarrow 2\ KNO_3 + CaSO_4$

If separated alone, $Ca(NO_3)_2$ could be processed in accordance

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with either reaction 1, 2, 3, 4 or 5.

All these processes have the same feature: available P_2O_5 is in the form of dicalcium phosphate which leads to savings in the acidity necessary to solubilize the rock phosphate as compared to processes producing monocalcium phosphate (superphosphate and solid phase processes). Generally speaking the products are granulated.

Basic problems confronting a manufacturer are the following:

1. Possibility of producing many various formulae in the same equipment to meet present and future demand.
2. Reduction of equipment and especially stainless steel requirements.
3. Reduction of cost (operating, cleaning, heating expenses, nitrogen losses, etc).

When estimating advantages of a process, all these factors must be taken into account.

For instance, the use of CO_2 in accordance with reaction 1. eliminates the need of H_2SO_4 but limits the ratio N_2/P_2O_5 to 1 as a minimum and requires aids to minimize the reversion of available P_2O_5 to insoluble P_2O_5. Moreover, if compared with the process using H_3PO_4 (reaction 3.), its advantage is diminished because the fertilizer obtained is less concentrated. But if CO_2 by-product is available at a low price, this process may be attractive.

The process in which $Ca(NO_3)_2$ is removed by filtration is attractive if lime nitrate easily can be marketed. It allows elimination of sulfuric and phosphoric acids but as yet that process is not operated on a commercial scale.

The use of potassium sulfate would be very attractive if potassium sulfate were available at a relatively moderate price.

The processes using H_2SO_4 in accordance with reaction 2. give a wide range of formulae and the expense corresponding to this is as low as five per cent of the total cost of the fertilizer.

With H_3PO_4, very highly concentrated fertilizers are produced and no sulfuric acid is required if phosphate acid is obtained from thermal process.

By 1941 the Company of Saint-Gobain, confronted with a very acute shortage of sulfuric acid in France, had to alter its fertilizer manufacturing process in order to reduce its acid needs. It was the beginning of its investigations in the field of the nitric acidulation of phosphates.

At first Saint-Gobain studied solid phase processes. Two commercial plants were operated in which rock phosphate was solubilized by a mixture of nitric and sulfuric acid. This necessitated but a few changes in the existing superphosphate facilities.

Diagram of St. Gobain Process

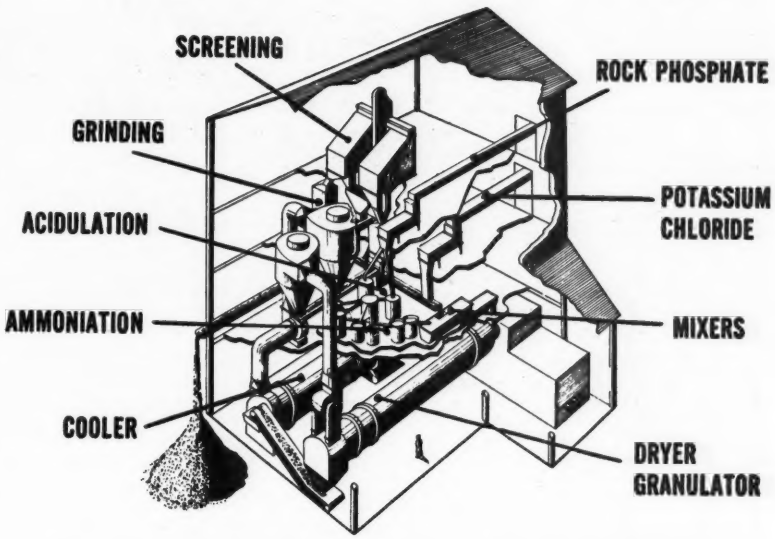

Diagram shows clearly the St. Gobain process for manufacturing granulated nitrophosphate fertilizer which has been in use 11 years in France.

St. Gobain Process

At that time research in the liquid phase acidulation field was initiated, many processes were investigated and the sulfo-nitric and phospho-nitric acidulations were selected. Processes were improved and two commercial plants erected. In both cases procedures and equipment are the same.

The process consists of the following steps:

1. Acidulation of phosphate rock by a mixture of nitric and either sulfuric or phosphoric acids.
2. Ammoniation of the slurry from the acidulation.
3. Addition of fines and optionally of a potash salt (for example: potassium chloride) to the ammoniated slurry.
4. Granulation.
5. Screening and grinding of the granulated product.

The end product contains either as much nitrate nitrogen as ammonia nitrogen and, in this case, its phosphoric acid content is in the form of dicalcium phosphate; or it contains more ammonia nitrogen than nitrate nitrogen and, in that case, the P_2O_5 content is in the form of ammonium phosphate and dicalcium phosphate.

If compared with other processes using nitric acid—either alone or mixed with SO_4H_2 or PO_4H_3—as acidulating agent, one must note that the Saint-Gobain process is the simplest one in regard to the number and sizes of equipment. This fact leads to important savings on stainless steel requirements and consequently results in lower capital and operating costs.

In addition to the simplification of the equipment, Saint-Gobain offers the following advantages:

1. Phosphate rock grinding is unnecessary. This costly operation is eliminated as a result of a special design of the acidulating equipment. The size of the raw phosphate rock is limited only by the requirement of the conventional continuous weighing devices which, of course, cannot weigh very large particles.

2. A very high nitrogen yield of the plant. Saint-Gobain has

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reduced losses of nitrate and ammonia nitrogen to a minimum. Thus the ratio of the nitrogen delivered to the consumer to the nitrogen introduced into the Saint-Gobain plant in the form of nitric acid and liquid ammonia has been calculated over a period of two years in large industrial plants at 98:100.

3. Great flexibility. Saint-Gobain process enables the manufacture of products with a ratio of P_2O_5 (in the form of dicalcium phosphate) to nitrogen (half nitrate, half ammonium nitrogen) equal to 1.5 in the case of a phospho-nitric operation and a ratio of 1.0 in the case of a sulfo-nitric operation.

Furthermore, the same plant with the same equipment can be used for both operations. On the other hand, the relative amount of soluble potash can be varied as required.

4. Saving is achieved not only in the scarce sulfuric acid but also in operating costs. The extremely simple flow diagram and equipment of the Saint-Gobain process enables considerable savings in power consumption, maintenance and labor requirements.

Well-known features of the granulated complex fertilizers include the following:

1. Reducing the sulfuric acid consumption by one-half, as compared with the superphosphates with the same content of available P_2O_5.

2. Economic advantages resulting from the fusion of several plants into one. This embodies the manufacture of superphosphate, ammonium nitrate, the mixing of N-P-K constituents and the granulation of the end product.

3. Non-hygroscopicity of the fertilizer, resulting from the absence of lime nitrate and the reaction between ammonium nitrate and potassium chloride. The latter reaction results in non-hygroscopic potassium nitrate and ammonium chloride.

4. Granulated form of fertilizers results in good drillability and lack of dust.

5. High concentration of fertilizers results in savings on bags, transportation and spreading for the same tonnage of fertilizer elements.

Contrary to what one might think granulation of complex fertilizers which enables one to cope with the sulfur shortage is not burdened with high operating costs. Its commercial application has shown that the simplicity of the equipment used results in savings on manufacturing costs which are of the same order of magnitude as the savings on raw materials.

TABLE 1

Formula	10-10-17	12-15-18	10-20-20
Morocco phosphate (ton)	0.309	0.256	0.194
Nitric acid (100% NO_3H) (ton)	0.232	0.274	0.184
Sulfuric acid (100% SO_4H_2) (ton)	0.107	..	..
Phosphoric acid (100% P_2O_5) (ton)	..	0.065	0.137
Ammonia (anhydrous) (ton)	0.0615	0.074	0.075
Potassium chloride (60% KCl) (ton)	0.284	0.300	0.332
Power (kwh)	35	35	35
Fuel oil (ton)	0.025	0.025	0.025

Saint-Gobain Works

Saint-Gobain operates two commercial plants in France, namely:

1. Chauny Works (Aisne): Yearly capacity of 50,000 metric tons. Has been in full operation since 1947. The phosphate rock in this plant is acidulated with sulfuric and nitric acids. The fertilizer normally produced is 10–10–17.

2. Rouen Works (Seine Inférieure)—in operation since 1941. Produces at the present time 120,000 metric tons of granulated fertilizers each year. The unit includes a phosphoric acid plant. Phosphate rock is treated with nitric acid and either sulfuric or phosphoric acids, or with both.

Commercial Unit—Nitric acid is used at a density of 36° Bé approx. Its flow rate is controlled by an orifice under a steady head of acid. Sulfuric acid is used in 78 per cent concentration (60° Bé) and phosphoric acid in 150 per cent concentration. The flow rates of the latter acids are controlled by conventional scoop wheels but their design has been altered by Saint-Gobain to improve their accuracy.

Morocco phosphate rock (without grinding) is used and is fed by means of an improved belt conveyor. Trials were made with Gafsa and other phosphates which gave the same results as with Moroccan phosphate. Acidulation is carried out in vessels equipped with very efficient special stirring devices.

Special design provides for avoiding any foam release. The resulting slurry is treated with anhydrous ammonia in vessels similar to those for acidulation. The total volume of the acidulation and ammoniation vessels necessary to produce 400 metric tons of fertilizers a day is 700 cubic feet.

For a plant of this size total requirements for stainless steel are only 10 tons. Potassium chloride and fines are introduced into the ammoniated slurry by means of small size mixers, then the product goes into a granulating and drying kiln.

Finished granules are cooled and screened. The coarse product is crushed, while the fines (undersize from screening) are recycled. The problem of crushing has been studied very thoroughly. Saint-Gobain plants require only one crusher which is free of clogging troubles.

Products—The following formulae can be produced by the Saint-Gobain plants:

N %	P_2O_5 %	K_2O %
10	10	17
11	11	11
10	15	20
12	15	18
12	12	20
14	14	14
10	20	20

(The first two formulae represent sulfo-nitric acidulation, the remainder phospho-nitric acidulation.)

In the last formula, a small amount of P_2O_5 is available in the form of ammonium phosphate. The fertilizer contains more ammonia nitrogen than nitrate nitrogen (6 per cent and 4 per cent respectively). In France, Saint-Gobain produces granules of 3 mm size, but the size of granules easily can

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Our own fertilizer plants have been experimenting with wetting agents to reduce curing time and prevent secondary caking of mixed fertilizers. SUL-FON-ATE AA 9 has been found to be very effective in this application and it is now being regularly used by our plants.

Tennessee's SUL-FON-ATE AA 9 is an alkyl aryl sulfonate containing 90% active ingredient. It is a powerful wetting and penetrating agent that promotes better contact between the fertilizer components. This intimate contact reduces the time required for completion of the reaction.

UNTREATED

TREATED

These pictures show the effect of the addition of Tennessee's SUL-FON-ATE AA 9 to one of our more troublesome formulas: Four units of nitrogen came from solution and the other two from sulphate of ammonia. Both samples were cured for 4 days and then bagged. The bags were stacked for 10 days and the above samples were taken from the bottom bags.

METHOD OF APPLICATION

Since manufacturing processes vary widely in fertilizer plants, the best method of introduction into the mixer must be determined at each plant. Our plants prefer to distribute it on the conveyor belt feeding into the mixer. In the pictures shown SUL-FON-ATE AA9 was added to the potash. It is not necessary to make any changes in operating procedure.

For further Information, please contact

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be altered to meet the demand of the market. The finished product does not cake during the storage. In fact, the bottom of a pile stored since more than a year ago and having undergone the pressure of the pile still appears in perfect condition. Some rare individual granules can be broken up by hand but do not form dust.

Cost items—Table 1 indicates material and utility consumptions for the manufacture of one metric ton (2205 pounds) of fertilizers:

For a 400 ton/day plant the total operating staff is estimated at eight men per shift. A plant of this size would require a building of 65′ x 65′ x 65′.

Conclusion

If the matter of saving sulfuric acid is an important one, the economics in manufacturing are a far more serious matter.

Any process which requires no sulfuric acid is attractive, but what about investments, stainless steel requirements, flexibility and maintenance?

The processes in which lime nitrate is removed by filtration raise the question of lime nitrate marketing, lead to huge capital investments and require very elaborate equipment.

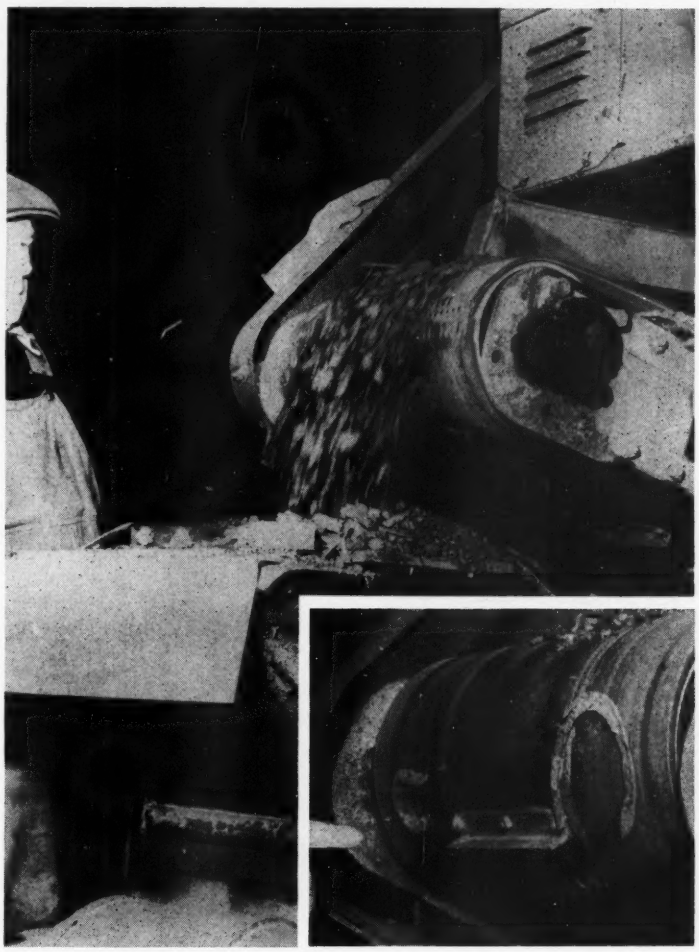
In the processes using CO_2 flexibility is very poor. As a matter of fact CO_2 does not act as an acidulating agent of phosphate, hence nitric acid must be introduced at a rate responding at least to the phosphate involved.

Ratio Fixed

Therefore the ratio N/P_2O_5 is fixed at 1 or more, except in the case of a low P_2O_5 conversion ratio. Furthermore, these processes are unable to produce as concentrated fertilizers as those from phosphonitric acidulation because, unlike H_3PO_4, CO_2 is not a fertilizing element. On the other hand, the use of CO_2 leads to higher fuel consumptions, higher losses in nitrogen and higher capital investments than the sulfo-nitric process.

After having studied in detail all of these processes, Saint-Gobain has selected the sulfo- and phosphonitric processes and developed a technique which from all standpoints is quite ahead of all others. ◆

Horseshoes Aren't Good Luck Here



How the Eriez magnetic pulley removes tramp iron from fertilizer materials is shown in large photo. Inset shows horseshoe and spike removed from the material before it reached the grinder.

Fertilizer manufacturers, who invest thousands of dollars in milling and grinding equipment, know the costly damage tramp iron can do to the machinery.

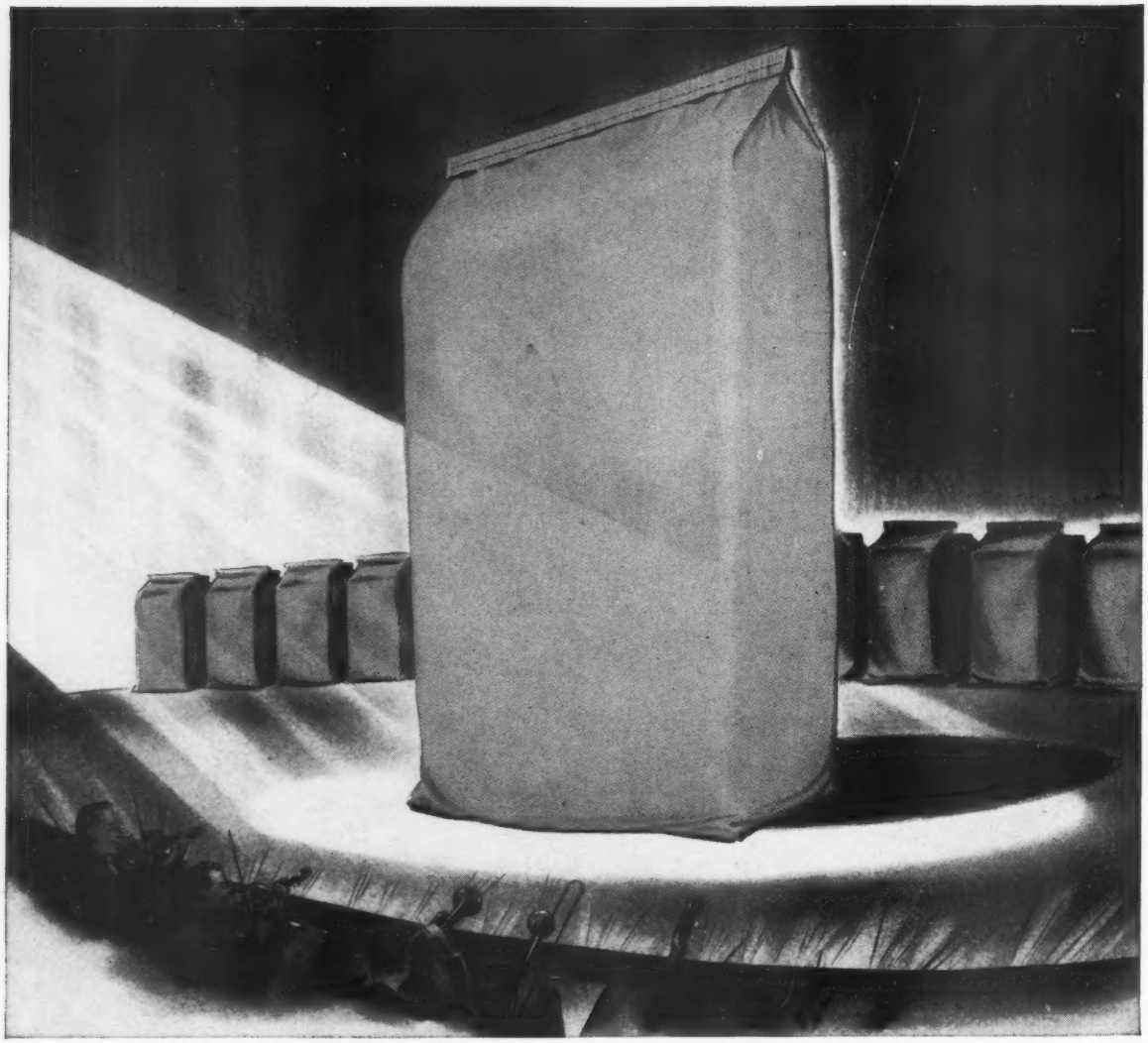
One manufacturer of compost found that as much as 25 pounds of the unwanted iron found its way into each ton of fertilizer, chiefly cow manure, processed in its plant. The manufacturer, Fertl-Soil Co., Rahway, N. J., solved the problem by using a magnetic pulley to remove the tramp iron.

The successful use of the pulley was reported recently by Eriez Manufacturing Co., which markets the Eriez Permanent Magnetic Pulley for just such jobs.

Here's how the system works:

Fertilizer is dried in a cylindrical dryer. It drops onto a conveyor, the head pulley of which is fitted with Eriez Alnico magnets working through the belt.

The pulley's magnetic field holds nails, small bolts, nuts and other stray metal bits. The non-contaminated product falls free by gravity at its natural tangent point while the tramp iron is held firm until carried out of the magnetic field of the pulley beyond a divider where it falls off the belt into a container. For further information on the Eriez magnets, fill out a **Reader Service** card, using **Code Number 2-22.**



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Who to see and when to see him are key factors in selling new products, one sales head says.

Problems in Introducing Development Chemicals

Many farm chemicals manufacturers have the headaches connected with the introduction of new products. Here J. V. Miller of Atlas Powder Co., gives his views on the complex subject taken from a talk before the Chemical Specialties Manufacturers Association.

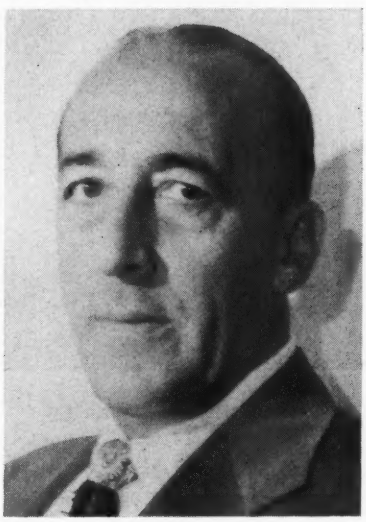
INTRODUCING a new development chemical to industry is a job that defies standardization. At the same time, certain situations do tend to repeat themselves until they form a pattern which the alert sales executive can recognize and act upon.

Some of these situations, and the tactics recommended to meet them, were discussed helpfully before the recent New York meeting of the Chemical Specialties Manufacturers Association by J. V. Miller, director of sales development in the Industrial Chemicals Department of Atlas Powder Company.

Talking about what he termed essential ingredients in a successful sale, Miller cautioned his hearers that these ingredients were by no means panaceas; that each would succeed as its user selected it and modified it to suit the situation. Also, he assumed the existence of a market and the salesman's knowledge of where to make calls.

See the Key Man

With those provisos, Miller named the purchasing agent as the man almost always to be visited first, and last as well. The purchasing agent, he explained, becomes the salesman's personal traffic manager. He tells the salesman who in the plant must be seen if the order is to stick. As an example, he described the call by an Atlas salesman on a large aircraft manufacturing company where, as the sale progressed, the salesman had to see and sell no fewer than 47 persons in a score of departments. Ultimately, however, the purchasing agent's guidance succeeded in reducing that number to five men in three departments.



J. V. Miller

Purchasing Agent

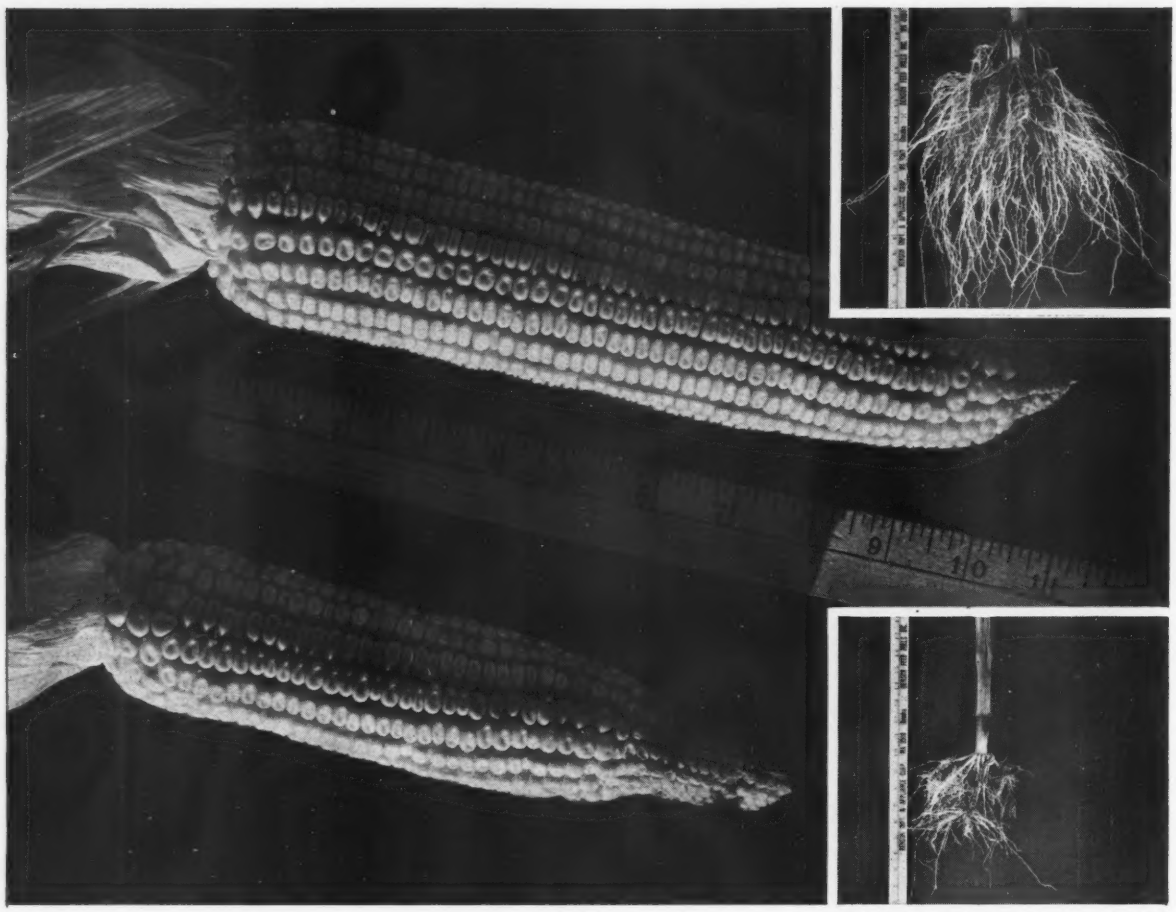
During all this time, Miller pointed out, the purchasing agent was being anything but idle. He was looking into every phase of the product and its maker to determine beyond question, if possible, the regularity of supply and half-a-dozen other factors which would guide his behavior in case the product proved acceptable to his technical colleagues.

In no two companies, he emphasized, would the chemical salesman face identical situations. But by and large, he asserted, the salesman who fails to get the purchasing agent on his side may work his head off without any useful result. It's after he has seen the purchasing agent that the real selling job begins.

Good Organization

In the chemical industry the first real selling job is likely to be that of convincing the prospect's chemist that the salesman is backed up by an organization which can and will deliver consistent quality; which can guarantee purity of raw materials; which can gear its sales service laboratory to supply co-operative research and which applies an effective program of quality control to its production. In other words, the salesman has to sell his company as well as its product.

Having accomplished that, he then has to contribute an imaginative idea which his chemist customer can use, Miller continued. It must be remembered that the chemist knows the product he's already using; his processing is geared for it, and he'll be reluctant to upset his system, no matter how good the new chemical, unless the salesman furnishes him with the spark, the visionary idea that lets him see for himself how the new chemical will convert his product into a fast-selling commodity. It is



aldrin-treated corn (*top*), untreated corn (*bottom*) from adjacent rows, clearly shows how treatment of the soil with aldrin promotes healthy roots, improves quality, increases yield.

1953 will be a BIG YEAR for aldrin on corn

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Many growers tried aldrin last season to fight the corn rootworm. Some went "whole hog" and were glad they did. Others treated just a small part of their acreage. We've yet to hear of a single user who isn't satisfied that aldrin is the answer to the corn rootworm problem.

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this idea which is the real key log of a sales development job.

There seems to be no simple way to go about this job, but it has to be done. Somehow, the chemist's sights must be raised, perhaps by appealing to him with some end characteristic which he interprets readily in terms of mass acceptance. In the case of a detergent, for example, he might catch fire at the development of a product that did not cause sneezing, or that left the skin softer. Another approach might be to talk about a staple supply in a world vexed by shortages.

Certainly it's harder to introduce a new product in prosperous times. But the salesman does have in his favor one potent assurance: the chemist can't afford to ignore his story, because competition has a way of stealing a march on overconfident chemists.

Telling Sales Story

After the chemist has been persuaded to prove out the product, then is the time, usually, to get the sales story to sales managers and other plant and marketing executives. Their job will be to keep management pressure on the chemist so that your chemical gets a good thorough testing.

Once the salesman has made these rounds, seeing everyone who may be a significant factor in the sale, he then returns to the purchasing agent and really goes to work to sell him on the service angle.

It's here that the salesman has to sell himself—convincing the purchasing agent that he will be looked after when things become tough, that credit relations will be taken care of and all the rest.

Relies on Reputation

For this portion of the job, the salesman relies heavily on his company's reputation and prestige, and those are usually the result, in great part, of the company's sales promotional effort—the space advertising, the direct mail, the technical articles authorized by its experts, its participation in industrial exhibits and so on. In this connection, don't overlook a valuable technique for low-cost market research—the printing press. By advertising and by supplying alert editors with sound, helpful article material, you can frequently explore and actually uncover new markets whose existence may not have been suspected.

Spark Is Needed

What of the sales manager's responsibility in such a development program? Briefly, his greatest contribution is to come up with the ideas that keep his salesmen constantly equipped with arguments and advantages. It's those arguments, remember, which will jar the chemist out of his complacency and start him running tests on the new chemical.

Finally, what kind of man can best accomplish this job of introducing a development chemical? In our experience, Miller said, he will be primarily the salesman rather than exclusively the technologist. The job needs the man with a spark, the enthusiast who's dissatisfied with the world and determined to build a better one with the products he's selling. That kind of pressure is necessary because in selling speed often is of prime importance.

Confirmed Salesman

From our experience, Miller concluded, it's better to hire the confirmed salesman who may need technical training than to look for the technically trained man with little or no selling experience. The man trained exclusively in the laboratory, he explained, might lack the sales sense to keep still after he has made the sale.

He might even win an argument with a customer's chemist, thus losing irrevocably all hope of making the sale.

Miller's own organization, he said, prefers hiring men fresh from college and training them in Atlas methods while they still are malleable.

It looks for the man popular with his fellows, rather than, automatically, the man at the head of his class.

And, if the man must be moved to another city, the company also interviews the man's wife because it believes that success must be based on happiness within the family. ◆

St. Regis Paper Has New Method

A major advancement in wood conservation in the Southeast Gulf region of the United States through utilization of barked sawmill slabs has been announced by St. Regis Paper Co.

The company has joined with W. T. Smith Co., Chapman, Ala. to use the slabs in the manufacture of kraft pulp and paper.

Equipment for barking logs before they move into the sawmill and chipping equipment is being installed by the lumber company. Chip shipments from the sawmill to the St. Regis "Kraft Center" in Pensacola, Fla., are scheduled to start this month.

Improved Usage

The development marks the first adoption in that area of a practice of improved usage which promises to add substantially to the overall wood resources of the South. In addition it will provide sawmills with a steady and profitable market for what in the past has been largely wasted material.

St. Regis has been interested in such a wood conservation program in the Northwest but equipment needed for barking and chipping in the big-log installations on the Pacific Coast required capital investment and power needs that could not be sustained by the usual sawmill operations in the South.

New Equipment

Application of such a conservation measure in the southern field was dependent on the development of production through use of a barker and chipper at a relatively low cost.

Equipment to do this now is available and the W. T. Smith Lumber Company is in the process of making the first installation in the Southeast Gulf Region. The Andersson barker and chipper to be used at Chapman, manufactured by the Soderhamn Machine Manufacturing Company of Sweden, represent the results of a close study of the requirements in the southern states.

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Free Information

On each of the two postage-paid postcards below you can request further information on four items described on this and the Industrial News section of this issue. ***Fill out one quarter section for each item in which you are interested.***

2-4 Sturtevant Mixer

Every advantage for quick, thorough, economical mixing can be obtained by using Sturtevant Dry-Batch mixers the company claims. It is a rotating drum type machine which will mix many materials into a homogenous and inseparable whole, company literature states. **Code Number 2-4.**

2-5 Pittsburgh 2,4-D

Increase sales and profits and build up a greater list of satisfied customers—this can be done by using Pittsburgh Ag Chem's 2,4-D, a company bulletin on the herbicide asserts. Quality-control at every step in its production guarantees more uniform and dependable weed killing, it adds. **Code Number 2-5.**

2-6 Good-rite K-700

Now available in quantity for preparing soil conditioners is B. F. Goodrich Chemical's Good-riterK-700, technical grade sodium polyac ylate, in dry or liquid form. Some advantages, according to company bulletin, include easy handling and its clear, odorless features. Material has a neutral *p*H. **Code Number 2-6.**

2-7 Atlox Emulsifiers

Why is it better to use Atlox emulsifiers? Company booklet says it's because these products make stable concentrates from a wide range of toxicants and solvents. Concentrates can be made with Atlox emulsifiers to blend with all kinds of water. Technical data are included in booklet. **Code Number 2-7.**

2-8 Chemico Construction

One reason for Chemical Construction Corp.'s prominence in the field of plant building is the fact that Chemico has created, designed and erected more than 800 installations during the past 37 years. If you want to "Discuss it with Chem.co," fill out a Reader Service card **Code Number 2-8.**

Here is a list of the NEW PRODUCTS and BULLETINS described on this and the Industrial News pages of this issue giving their monthly code number.

2-1 Transportoweigher
2-2 Elevator Chain
2-3 Safety Hat
2-4 Sturtevant Mixer
2-5 Pittsburgh 2,4-D
2-6 Good-rite K-700
2-7 Atlox Emulsifiers
2-8 Chemico Construction
2-9 Barber-Greene Film
2-10 Nitrogen Solution System
2-11 Sequestrene
2-12 Acid Carboy Dumper
2-13 V-Belt Conveyor
2-14 Lustrex X-820
2-15 Com-Bin Feeder
2-16 Agricultural Emulsifiers
2-17 Clark Stoway
2-18 Flexcoat Coating
2-19 Aldrin Data
2-20 Berkshire Magnesia
2-21 Pesticide Dilvents
2-22 Eriez Pulley

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2-9 Barber-Greene Film

A new 16mm sound-color film describing the complete line of Barber-Greene equipment for handling and processing is available from the company. Running time of this unique film is 22 min. Each type of machine is shown in operation and in a variety of applications. For information on borrowing it, fill out a Reader Service card. **Code Number 2-9.**

2-10 Nitrogen Solution System

Materials required for the installation and operation of a nitrogen sulution system are described in a technical bulletin from J. M. Tull Metal Co. It lists and gives data on aluminum pipe and fittings, valves and gauge glass fixtures, hose, compressors and other materials. **Code Number 2-10.**

2-11 Sequestrene

Applications in the formulation of 2,4-D amine sprays, metal complexes for nutrient solution use and treatment of mineral deficiencies in crops are outlined in a bulletin of information on Alrose Chemical Co.'s Sequestrene. **Code Number 2-11.**

2-12 Acid Carboy Dumper

Quick, safe handling of acids is permitted if you use a carboy dumper manufactured by General Scientific Equipment Co. The G-S Speedo Safety Carboy Dumper No. 77 has many industrial uses which may be of interest to you. **Code Number 2-12.**

2-13 V-Belt Conveyor

A new four-page bulletin on its specially-designed V-Belt conveyor for transporting paper, cloth or burlap bags from filling and weighing equipment through bag-closing operations has been prepared by Richardson Scale Co. **Code Number 2-13.**

2-14 Lustrex X-820

Insecticide and fertilizer binders are listed as some of the uses for Lustrex X-820, a carboxyl-containing polyelectrolyte resin manufactured by Monsanto Chemical Co. **Code Number 2-14.**

2-15 Com-Bin Feeder

Pulva Corp.'s Com-Bin feeder is described and illustrated in a new four-page bulletin just issued by the organization. It explains how the Com-Bin can store and feed uniformly any non-free-flowing materials. **Code Number 2-15.**

2-16 Agricultural Emulsifiers

The new agricultural emulsifiers—Triton X-150 and Triton X-160 are being introduced commercially by Rohm & Haas Co. A technical bulletin describing the materials is available from the company. **Code Number 2-16.**

2-17 Clark Stoway

If materials handling comes under your jurisdiction, you will be interested in information on Clark Equipment Co.'s new "stand-up" Stoway. **Code Number 2-17.**

2-18 Flexcoat Coating

Flexcoat Maintenance Coating was developed to meet the needs of industry for a coating which would give protection against corrosion caused by atmospheric conditions, vapors, splash of chemicals and other causes. Information is available. **Code Number 2-18.**

2-19 Aldrin Data

Technical information on formulation of the insecticide aldrin is available from Shell Chemical Corp. Company says the material, in dust form, easily can be mixed with fertilizer and applied by conventional fert-spreading equipment. **Code Number 2-19.**

2-20 Berkshire Magnesia

Berkshire Chemicals, Inc. is a long time specialist in magnesia for agriculture. Information on their EMJEO (80/82 per cent magnesium sulfate) and other chemicals in the line is available. **Code Number 2-20.**

2-21 Pesticide Diluents

Several types of pesticide diluents, their chemical properties and uses, are described in a folder from the California Industrial Minerals Co. The company says its Frianite M3x is a superior standard diluent for dry blending or formulating dusting pesticides. Other materials and their prices are described. **Code Number 2-21.**

Reader Service inquiries will be honored up to six months after date of publication of the magazine in which they appear.

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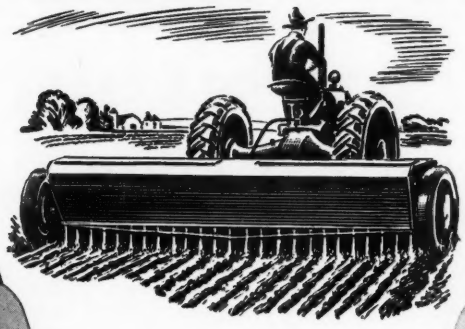

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Have you considered these important facts about maintenance in preventing fires in your fertilizer plant?

Fire Prevention By Maintenance

By George G. Blair
Ebasco Services, Inc.

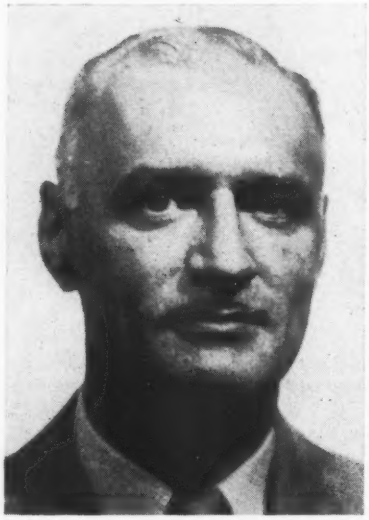
FIRE protection involves prevention, control and extinguishment. Even under the best protection plan some fires will start, and despite considerable extinguishment facilities, some will get beyond control.

A realization of these possibilities compels primary attention to the possibility of fire control as a major factor in any fire. Control means restricting the burning to the point of origin without permitting spread beyond the limited area involved. Under ideal conditions of control there would not be total destruction of a plant, and in fact, there should not be a large loss fire.

By proper spacing of buildings, subdivision and segregation by fire walls and adequate protection of vertical openings in fire resistive buildings the problem can be controlled at the design stage in new structures. However, changes made in well laid out plants either through ignorance or thoughtlessness may destroy a design benefit—or, in a less desirable plant, convert a large loss probability into a total loss possibility.

Design Important

Good design characteristics must be maintained and less favorable situations should not be worsened. There should be no need to mention that frame additions increase the hazards—and the insurance cost—when added to masonry buildings and that similar potentials are created when any inferior addition is added to a fire-resistive structure.



G. G. Blair

Care should be exercised to maintain proper clearances between buildings. When additions or new buildings are constructed between existing structures, the ability to limit a fire is impaired unless there is ample space, taking into account the type of construction, the size and the occupancy of all the buildings involved. Very often such construction has made one large fire risk where but two small ones existed before.

Fire walls should remain unpierced, or if openings are necessary, the effectiveness of the walls should be maintained by providing proper approved automatic or self-closing fire doors or shutters. Any pipe holes should be cemented or bricked tightly around the pipes.

Occupancy changes may lead to serious exposures. When a building has been erected specifically for a process a change in the use of the area may lead to a serious exposure. This is especially true if less-than-fire-resistive construction was employed because original plans contemplated the storage or processing of materials of a non-combustible nature which later were changed to a more hazardous storage or use.

Such a change may involve drastic modifications in the interest of maintaining safety. First, to maintain fire control features, it may be necessary to install automatic sprinklers when the occupancy becomes of combustible nature. Then, if a vapor or dust condition is created, other necessary revisions could include a complete change in the electrical components to meet code requirements for dusty or explosive atmospheres.

Magnetic Protection

If the grinding or breaking of an incombustible material is changed to such an operation on combustible stock, magnetic protection should be required ahead of any grinder. Certain new fire walls or partitions may be advisable to segregate features of an occupany changed to a more hazardous classification. If the section is sprinklered, increased water requirements might result.

Although a recitation of these unfavorable possibilities illustrates that common sense would compel a decision against such changes, or for proper safeguards if the changes are made, there is a surprising occurrence of such poor practices. A large part of the maintenance of fire protection consists of vigilance

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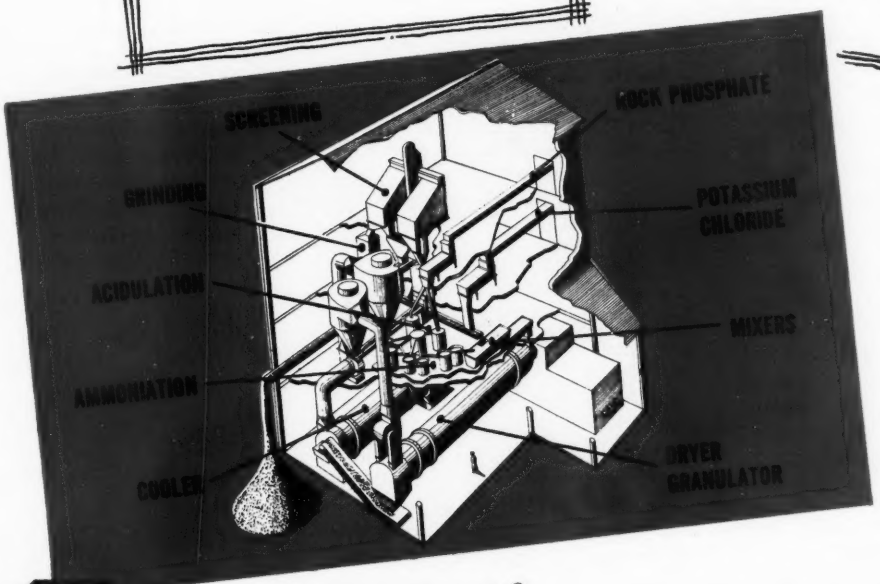

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12	12	20	" " "
14	14	14	" " "
10	20	20	" " "

in maintaining the integrity of existing structures, segregation and occupancy.

Prevention through the elimination of fire causes is perhaps the easiest method of damage reduction but there are innumerable conditions and remedies requiring constant watchfulness. In the present national loss statistics, fertilizer plants are included under the general classification of chemical plants and the exact fire record of the business is somewhat vague. However, in this class, over 70 per cent of the fires are attributable to common and special hazards such as: spontaneous ignition and overheating, electrical misuse, smoking and matches, grinding or mixing, defective heating equipment. The known fires in the fertilizer industry follow this pattern.

Causes Undetermined

Too frequently exact causes are not determined, but among the more frequently noticed defects or departures from Underwriters' standards in fertilizer plants are such miscellaneous faults and practices as:

1. More than a one day supply of oxidizing, decomposing or spontaneous heating materials in the main building.
2. Wooden lockers or lack of metal lockers where needed.
3. No standard waste cans for rags and similar materials.
4. Grease on floors and equipment supports.
5. Unslaked lime, garbage tankage, sludge and similar materials in contact with wood, on wooden floors, or in combustible bins.
6. Dynamite improperly stored.
7. Open trash and bag burning.
8. Lack of approved mufflers on tractors and fueling of tractors inside.

General heating equipment deficiencies are chiefly:

1. Salamanders or stoves used.
2. Stovepipes and stove and dryer clearances.
3. Unapproved oil burners and gravity oil feed.
4. Unguarded radiators or pipe coils.

Electrical installation hazards are chiefly:

1. Defective electrical extensions.
2. Motors not of dust proof type.
3. Corroded electrical system components.

In most of the foregoing the remedy is obvious once the defect is recognized, but some explanation may be pertinent.

Storing Materials

Materials which may intensify a fire or that are subject to heating should be kept in their proper segregated storage areas and brought out for use only as needed to meet requirements. To facilitate operations a one day supply of such materials generally is allowed in the processing areas, thus assuring that all of that in the main building will be used each day.

Nitrates are among materials so considered and the rule is to segregate them properly. There is no question that some nitrates will burn, and others will decompose under fire conditions to yield oxygen and oxides of nitrogen which increase the intensity of a fire and emit fumes which may complicate fire fighting.

The fume liabilities in the event of a fire also should be guarded against when ammonium nitrate in an ammoniating solution is introduced in or stored near a building. Tanks for such material should be properly designed, not located near other equipment of combustible nature and provided with safety relief and control valves at the tank as well as at the point of use.

Materials subject to spontaneous heating or heating when damp should not be permitted anywhere except in incombustible bins or vaults. This generally applies to various organic materials and to unslaked lime. There have been several fires which started in or near such materials.

As to dynamite or other explosives—the dynamite, if used, and detonators should be separately and remotely stored. Underground vaults with substantial but unattached covers with all metal parts bonded and grounded and without heat or light devices inside, perhaps offer the best protection.

Greasy clothing in wood lockers and strike-anywhere matches in clothing in lockers have caused fires which would have been confined to the locker contents if substantial metal lockers had been provided.

Oily rags and other trash belong in covered cans until safe disposal. It is good practice to have covered metal cans or metal lined bins with self-closing tops for clean wiping rags and similar materials.

Where stem pipe coils or radiators are used for heating at floor level they should be provided with screen guards whenever they are subject to use as clothes drying racks.

Bearings, conveyor systems and elevators must be maintained in proper alignment and properly lubricated and cleaned to avoid frictional overheating as a fire source, and loading, dumping, mixing and filling areas and elevator heads and pits should not be overlooked in the general plant housekeeping.

Heating Equipment

There should be no need for makeshift heating arrangements such as stoves or portable devices in any new plant, but where stoves are used, there are well established standards for their arrangement, and for proper clearances, including those for stacks and vents. Oil fuel devices should bear the label of Underwriters Laboratories, with any oil storage conforming with the NFPA Flammable Liquids Ordinance. Portable oil heaters should never be filled while in service. This is a rule freely treated with contempt, frequently with disastrous results.

In general stoves should be substantially set on legs on masonry or masonry-protected floors. It is advisable to contemplate a three foot clearance around the stoves, maintained by metal screens if necessary. Where metal stove-pipes must pierce combustible walls or roofs, the clearance to wood, including wood members of wood skeleton metal clad walls, should be maintained by metal collars or braces affording a minimum of six inches clearance all around ordinary small sized stovepipes.

This calls for a circle 18 inches in diameter around a well centered 6-inch stovepipe. For gas units requiring vents, there are Underwriters' approved flues generally needing but one-inch clearance for

other than large BTU capacity heaters.

Maintenance Inspections

Electrical installations should have regular maintenance inspections to insure continuity of operation, safety to life and absence of fire hazards. Motor and equipment frames and metal protected wiring systems should have the required ground connections. Open wiring should be maintained firmly supported at the proper distances on standard insulator supports, and sections torn loose or otherwise abused should be replaced.

Fuses require occasional checking, because it is common to find the original 15 ampere safety devices on No. 14 wire branch circuits replaced by 30 ampere fuses, thus removing the safety factor. Watch for pendant lamps in contact with combustible materials such as bags and boxes. These should be rearranged, or wire guards may be necessary over lamps. In some cases a double globe would be advisable even though the location is free from dust, dampness or vapor hazards.

Electrical equipment subject to corrosion should be kept well painted with corrosion resistant paint, and motor frames, windings, starting devices and bearings should be cleaned of dust as often as is necessary, to insure long and safe operation. Any open equipment in dusty locations may be noted for replacement by dust tight devices in long range improvement planning.

If several changes have been made in an original electrical installation, it may be well to have the load checked at various points, and when such is done, the resistance to ground also should be tested.

A word of caution appears in order for temporary installations. "Temporarily" is an unreasonably long time, very frequently, but regardless of the length of time a substitute motor or circuit is intended to be used it should be installed in a substantial manner with proper fusing and grounding.

Watch Smoking

Smoking should be permitted only in safe areas, not where combustible stock or supplies or materials in combustible containers are stored or where localized specific hazards exist. Areas designated as permissible for smoking should be provided with metal receptacles for discarded smoking materials, and a campaign for safe smoking habits may be productive.

Cutting and welding torch use is accounting for an increasing number of fires despite widespread publicity for safe use. Be certain the users are qualified to the extent of knowing the hazards and safeguards for the combustible and explosive materials being worked on or nearby, when portable cutting or welding equipment is being used outside the welding shop. Do not permit the torch to replace the hack saw completely.

Last month G. G. Blair of Ebasco Services, Inc., discussed another important phase of fire prevention in fertilizer plants—the importance of design. This month he discusses maintenance. The article is taken from a talk before the recent Fertilizer Section Safety meeting in Chicago.

The carpenter shop, blacksmith and machine shops, paint shop or storage building, garage and print shop and perhaps other auxiliary maintenance or process sections all present the usual hazards common to such occupancies and require inspection vigilance.

Gasoline tractors and dumpsters, if used, always should be filled outside, and water type mufflers, where used, should be properly maintained to prevent these machines from introducing additional hazards.

As in the case of any other type of equipment fire protection devices need reasonable care. The best equipment can be rendered useless by poor maintenance. Because fire equipment is strictly for emergency use, it should be maintained in constant readiness. Inspection, testing and training in use are essential to proper performance when emergency arises. Thorough inspections should be made, preferably weekly, and not less than monthly.

Where equipment is extensive, such as at locations with sprinkler and outside yard hydrant systems, a self-inspection form should be completed and filed through definite supervisory channels. Forms are frequently designed to fit the individual risk or plant, but various sources offer general fire protection inspection blanks. In some cases, such reports are a requirement of underwriters on a weekly, bi-weekly or monthly basis.

The inspections should be made at stated times regardless of any inspections by the interested underwriters. It is well also to plan to have alternate inspections by various fire brigade members, although the normal procedure is to choose inspectors with some mechanical knowledge.

Self-Inspection Form

Most frequent inspection with testing is accorded automatic sprinkler and private water supply systems. It is most important that all normally open control valves be checked to see that they are open and accessible. They should be operated their full gate travel distances occasionally to make certain of their operative condition.

Where sprinklers subject to freezing are served by dry pipe valves, air pressure must be checked regularly, at least weekly, at which time the alarms also should be tested. Wet pipe sprinkler alarm valves also should be tested at short intervals, except that it is best not to run water through hydraulically operated alarms during freezing weather.

Make sure that no sprinklers are missing or disconnected, or obstructed by stock or structural alterations. Note for remedial attention any heads loaded with dust or other deposits, or any corrosion of heads or pipe such as is likely to be caused by ammonia fumes or acid mist. Provide guards for heads subject to mechanical injury.

Fire pumps should be brought up to speed and pressure weekly, at which time, make certain that any priming tanks are full. Gravity tanks and reservoirs are to be kept full, and in cold weather, the functioning of the heating systems should be checked. It would be advisable to check the latter well

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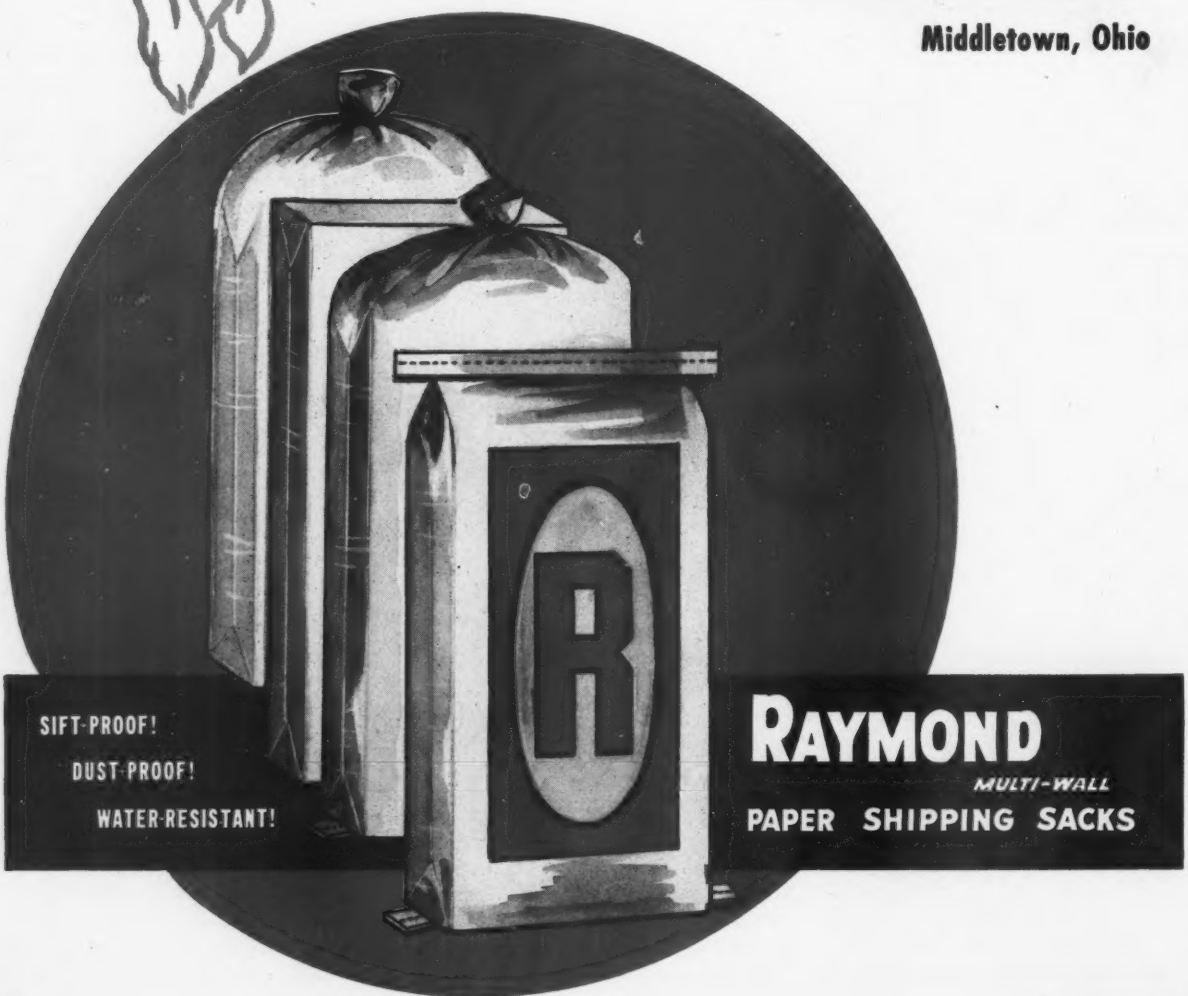

before the advent of cold weather. Flushing and cleaning should be performed as required.

Check Hydrants

Hydrants should be checked in spring and fall by opening the valves and flushing and then making certain that the barrels drain when the valves are shut. Lubricate hose thread caps, if necessary. Check the condition of hose and try to use all cotton rubber-lined hose in rotation semi-annually, at practice sessions, thoroughly drying and reracking the hose after use. Linen hose should not be used except at a fire, or for testing if its condition appears doubtful.

Before reinstalling it must be dried carefully because dampness rots this type of hose. See that auxiliary equipment is in the hose houses and replace or repair any damaged equipment.

Standpipe valves should be checked to make certain water is not leaking into the attached hose, and the hose should be kept attached.

Extinguishers should be in their proper places and readily accessible. Occasionally, after recharging, a careless interchange of extinguisher types may be made which seriously impairs protection in two or more areas and creates a life hazard as well. Such would be the case if a conductive stream extinguisher were used in haste on an electrical hazard, or should an attempt be made to use a gas type extinguisher on a serious Class A fire.

The general condition of extinguishers, including hose and nozzles, should be ascertained at each inspection. A complete examination, including discharge, cleaning and refilling of soda-acid and foam types should be an annual practice. At such times also, carbon dioxide type extinguishers and the gas cartridges in the various gas-operated extinguishers should be weighed to check the charges of gas, and the solution or powder should be examined to check its amount and condition. Pump type extinguishers require a few strokes of the pump.

Fire Brigade

The fire brigade (including watchmen) should maintain its efficiency by practicing with the various protective devices provided. It also is advisable to have all employes familiar with the "first aid" or hand type fire extinguishers. The office help should be so trained, as well as plant force. The annual recharging period presents a good opportunity to demonstrate the correct uses of the various types of extinguishers.

Permit other personnel to use the extinguishers located at or near their respective work stations. Much of the value of the annual recharging procedure is lost if extinguishers are merely "dumped" and recharged, or if recharging is done elsewhere than on the premises.

When in doubt as to the use of an extinguisher, and certainly before its use is needed, do not forget that brief instructions for use as well as for recharging appear on the label of every hand-operated extinguisher. Those instructions should be a required one minute of reading for everyone in the vicinity of an extinguisher.

Summary

Summarizing, maintenance factors in fire protection require that specific or favorable design features affording fire control through limitation of damage, such as space and fire walls, be maintained during plant alterations and expansion; that no occupancy be established in a structure unsuitable for that occupancy or creating an exposure to important property; and that special safeguards be provided for changed operations which introduce an element of hazard.

Elimination of fire causes requires common sense and vigilance.

Most common hazards present loss possibilities in practically every type of plant and each specific industry has a few special hazards peculiar to the industry. Those found in fertilizer manufacturing operations are neither unusually numerous nor insurmountable, and their study and removal will present a great opportunity for bettering the fire safety record of the industry.

Equipment Available

Fire equipment is available which is suitable for the conditions found in the industry. Proper maintenance requires no more than scheduled weekly to monthly inspections, and semi-annual to annual usage. Such use of the major equipment affords fire brigade training; the testing of the smaller devices offers an opportunity both to instruct and interest the entire personnel group. ◆

Other Sources

Author Blair urges readers in the fertilizer industry to seek the assistance of qualified consultants, state inspection or rating bureaus or the representatives of interested underwriters.

He lists the following publications as sources of further help:

"Fertilizer Grade Ammonium Nitrate," Manual Sheet A-10, 50 cents, Manufacturing Chemists Association, Inc., 246 Woodward Bldg., Washington 6, D.C. Describes handling and storage of the product.

"Employe Organization for Fire Safety," National Fire Protection Association, 60 Batterymarch Street, Boston 10, Mass.

Various pamphlets on specific protection standards or suggested structural and occupancy safeguards, by the National Board of Fire Underwriters, 80 John Street, New York City.

"Organizing Your Plant For Fire Safety," $2, Associated Factory Mutual Insurance Companies, 184 High Street, Boston 10, Mass.

Assistance may be gained also from material offered by these equipment manufacturers:

"Training Your Fire Brigade to Use First Aid Extinguishers" Walter Kidde & Company, 140 Cedar Street, New York City.

"Maintenance of First Aid Fire Fighting Equipment," American-La-France-Foamite Corporation, Elmira, N. Y.

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FERTILIZER MATERIALS MARKET

New York

January 12, 1953

Sulfate of Ammonia

Foreign material has been sold in large quantities as low as $47 per net ton at Atlantic ports, which price is cheaper than domestic material at certain points. Since the price of the domestic sulfate of ammonia was recently advanced, buyers have shown a strong tendency to withhold shipping instructions in some directions.

Nitrate of Soda

With no price changes reported in nitrate of soda, stocks were said to be adequate at most ports where this material is stored.

Ammonium Nitrate

The supply of this material is still reported to be short in certain sections with producers filling present contracts from their production.

Urea

This material is still reported in short supply with imported material being quoted at prices ranging as high as $160 to $170 per ton at the ports. Demand is mostly from industrial users.

Nitrogenous Tankage

A rather mixed situation prevailed in this material. While some producers claim to be sold out until June, others report material available for nearby shipment. Prices range from $4.90 to $5.50 per unit of ammonia ($5.95 to $6.68 per unit N), according to shipping point.

Organics

Organic fertilizer materials displayed a mixed tone with soybean meal for nearby shipment selling as low as $68 per ton in bulk, f.o.b. Decatur, Ill. Future positions were quoted slightly higher. Linseed meal, because of the small supply, was selling at $82 per ton in bulk, f.o.b. Minneapolis, Minn., and cottonseed meal was selling several dollars per ton under most ceiling prices at various shipping points. Tankage last sold at $6.25 ($7.59 per unit N), f.o.b. Eastern shipping points, with blood at about the same price and the Chicago market was about 50 cents per unit of ammonia (60 cents per unit N) higher.

Fish Meal

Demand for this material was rather quiet from both the fertilizer and feed trade. Imported fish meal continued to arrive at various ports and was quoted under the price of menhaden fish meal. Current prices are about $125 to $130 per ton at the port, according to quantity and quality.

Bone Meal

Feeding bone meal was moving rather slowly at present time but fertilizer steamed bone meal seems to be in fair demand with prices around $75 per net ton, f.o.b. shipping points, with supply limited.

Hoof Meal

Last sales of this material were made at $6.75 per unit of ammonia ($8.20 per unit N), f.o.b. Chicago, Ill., with buyers showing a fair amount of interest.

Superphosphate

With the exception of triple superphosphate, this material was in better supply at most points since the relaxation of the sulfur quotas. Most buyers had no difficulty in securing all the material they need.

Potash

Very little trading was noted in imported potash because domestic producers so far have been able to supply a good part of the buyers' requirements. Some potash producers were experiencing some difficulty in securing instructions from buyers against current contracts. In some areas buyers are fairly well loaded up with materials and lack storage room.

Cocoa Shells

The supply of this material was recently reported to be better with prices a shade easier.

Philadelphia

January 12, 1953

There is pronounced lack of activity in the raw materials market. Blood and tankage are considerably weaker. Nitrate of ammonia continues in short supply, but there is ample nitrate of soda to meet all demands. Sulfate of ammonia, while reportedly tight, seems to be sufficiently available to keep fully up with the demand. Bone meal is in very slack demand, while superphosphate is more plentiful. Potash is moving slowly and stocks are ample. Farmers are said to be very slow in ordering out their mixed fertilizers.

Sulfate of Ammonia.—While described as tight, there seems to be no difficulty in taking care of the demand. Large quantities are offered from Europe at prices in line with domestic material.

Nitrate of Ammonia.—This material is still in very short supply.

Nitrate of Soda.—Demand is seasonally quiet, and the supply is quite sufficient to meet all requirements at present.

Blood, Tankage, Bone.—Packinghouse by-products are in a very weak position at present, with prices lower than published reports. Tankage is offered at $5.50 to $6.00 per unit ammonia ($6.68 to $7.29 per unit N) in the East, and $6.75 ($8.20 per unit N) in the West. Bone meal is very quiet and quoted nominally at $75.00 per ton for steamed grade, but it could be had for several dollars per ton under this figure. Hoof meal remains without interest.

Castor Pomace.—This is still quoted at $37.25 per ton with exceedingly limited offerings.

Fish Scrap.—Demand is quiet with domestic menhaden quoted at ceiling prices. Foreign offerings are

Not even fire could stop the progress of C. O. Smith Guano Co. of Moultrie, Ga. Burned to the ground in late November 1950 (see picture at left), they re-built and went on to set a new tonnage record in 1951. Fully modern, the three Smith buildings have more than 160,000 feet of floor space and a capacity of 100,000 tons. Smith's *Georgia Pride* and *Higrade* brands received the first car of Spensol ever shipped into Georgia.

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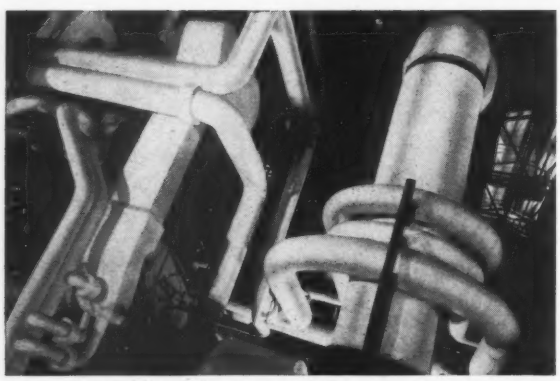

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numerous at several dollars per ton cheaper.

Phosphate Rock.—Market shows no significant changes. Demand for shipments has quieted down and the lower grade Florida continues to be in greater supply than the high grade.

Superphosphate.—Supply is now fully equal to the demand, with contract shipments slowing down and stocks accumulating in some areas. Production in 1952 was in excess of 1951.

Potash.—Shipments of domestic have fallen off and tonnage in storage is increasing. However, market is reported firm. The supply is said to be quite large in Europe.

Charleston

January 12, 1953

Many manufacturers of mixed fertilizers are somewhat crowded for storage space but expect shortly that the movement of mixed goods will ease this situation. No serious shortages of any of the major ingredients of fertilizer are apparent at the moment.

Organics.—Demand for fertilizer grade organics, at present, is rather quiet as mixed fertilizers have not yet begun to move in heavy volume. Prices of domestic nitrogenous tankage range from $4.60 to $5.00 per unit of ammonia ($5.59 to $6.08 per unit N), bulk, f.o.b. production points and limited supplies are available. Imported nitrogenous tankage varies in price from $5.75 to $6.15 per unit of ammonia ($6.99 to $7.47 per unit N), in bags, c.i.f. usual Atlantic ports.

Castor Pomace.—Domestic production is held at $37.25 per ton in burlap bags or $2.00 per ton less in paper bags, f.o.b. Northeastern production points, with quantity limited. Imported material ranges from $36.50 to $43.50 ex-vessel Atlantic ports, depending on the quality.

Blood.—Unground dried blood is indicated in the Chicago market at around $6.50 per unit of ammonia ($7.90 per unit N), bulk. The New York market is around $6.75 ($8.20 per unit N).

Potash.—Demand for domestic muriate of potash is slightly off due to heavily stocked position of most fertilizer manufacturers. Interest in imported muriate is rather quiet. Prices remain stable.

Ground Cotton Bur Ash.—This source of potash, primarily in the form of carbonate of potash, is available for prompt and spread shipment at prices approximating the delivered cost of domestic sulfate of potash. Analysis is usually 38 per cent to 45 per cent, averaging about 41 per cent K_2O.

Phosphate Rock.—Demand for domestic phosphate rock is in seasonal dimensions and the supply position on high-grade rock continues somewhat shorter than low-grade rock. Prices remain at ceiling levels.

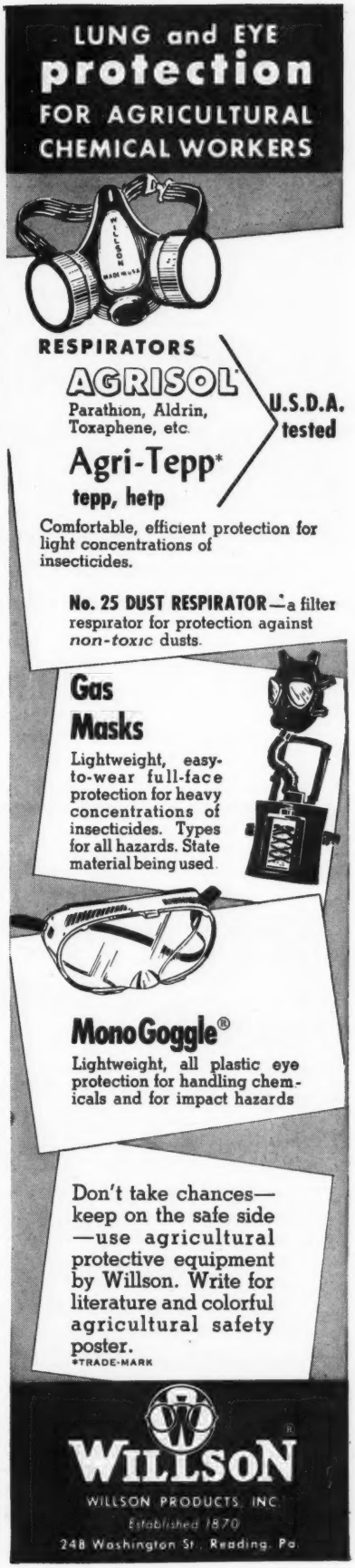
Superphosphate. — Supply position continues comfortable with good stocks on hand in most areas. Prices remain firm at ceiling levels.

Sulfate of Ammonia.—Domestic producers continue to ship from production. Limited stocks of imported material are available at some Atlantic ports at prices around $50.00 per ton, bulk.

Nitrogen Solutions.—Demand continues strong, maintaining the market in a fairly tight position.

Nitrate of Soda.—Stocks of imported material are being built up for spring requirements and domestic material is in good balance with demand. No change in prices has been noted.

Calcium Ammonium Nitrate.—Some arrivals of this form of ammonium nitrate, testing 20/21 per cent nitrogen are expected this month at several Atlantic and Gulf ports. Price continues at $51.25 per ton, f.o.b. cars at the ports, packed in 100 lb. paper bags.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Industrial News

New Products **New Plants** **New Appointments**

New Bill Seeks Change In Labels for Pesticides

A change in the federal pesticide law to require manufacturers to place the name of each inert ingredient on the label as well as the percentage may be made by Congress.

The amendment is included in a bill introduced in the House by Rep. Frank E. Smith, of Mississippi. It would amend the ingredient statement included in the federal insecticide, fungicide and rodenticide act so as to require a more adequate statement of ingredients in economic poisons.

The present act requires the naming of the inert ingredients only in cases where the economic poison is highly toxic to man.

Rep. Smith termed the existing provision a loophole. He said the Mississippi act, patterned after the federal law, had been corrected by state legislation.

Stauffer Chemical Buys Consolidated Chemical

Stauffer Chemical Co. took control of Consolidated Chemical Industries late last year after purchasing an additional 35,660 shares of stock.

Stauffer already had owned 40,000 shares of Consolidated's Class B voting stock, or half of the outstanding shares. The additional purchase was made from the estate of Solomon Peiser, late president of the company.

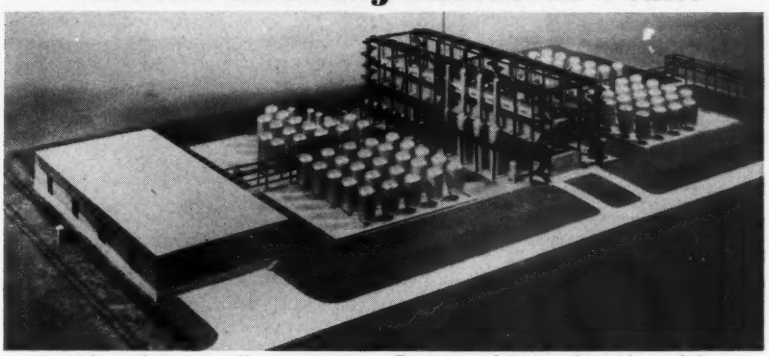
Consolidated owns and operates eight plants in San Francisco, Cal.; Houston and Fort Worth, Tex.; Baton Rouge, Springhill and Bastrop, La.; Little Rock, Ark.; Boston, Mass. and Buenos Aires.

Stauffer now owns 94½ per cent of the Class B common stock.

Krilium Price Cut

A price slash on Krilium has been announced by Monsanto Chemical Co. It means a cut of 28 to 33 per cent in the retail price of the soil conditioner and will benefit mainly home gardeners and nurserymen.

Carbide Building Allethrin Plant



Carbide and Carbon Chemicals Co., a Division of Union Carbide and Carbon Corp., is constructing a new allethrin plant at Institute, W. Va. like the model shown above. Completion of the four-acre plant, expected to be the largest producing the new insecticide, is scheduled for early 1954.

Production of Super Shows Gain in October

Production of normal and concentrated superphosphate during October, 1952 showed an increase over September of 13 and 12 per cent respectively, the Department of Commerce reported last month.

Production represented gains of nine and 41 per cent for the materials over October 1951. Total was 840,166 short tons for normal, 81,217 for concentrated and 5,064 tons for wet-base goods.

For the period January through October increased by 14 per cent for normal and 19 per cent for concentrated over that period the year before.

Wheatley Joins Crag In Market Development

James R. Wheatley has joined Crag Agricultural Chemicals in the market-development section. A graduate of the University of Delaware in the class of 1950, Wheatley received his M.S. degree in agriculture after conducting research in the nutrient-foliar feeding of plants at the agricultural experiment station at the University.

Wheatley

Water-Soluble Fertilizer

Folium, a new water-soluble fertilizer, has been developed by Monsanto Chemical Co.

Folium, which will be offered to the public early this month, was formulated to minimize risk of leaf or grass burn, the company reports.

It is a quickly-soluble inorganic plant food with a 20–20–20 analysis.

Smith-Douglass Plant Holds Safety Record

Just what a well-organized safety program can mean to company accident records was shown graphically last month in figures released by Smith-Douglass Co. concerning its fertilizer plants in Virginia and other states.

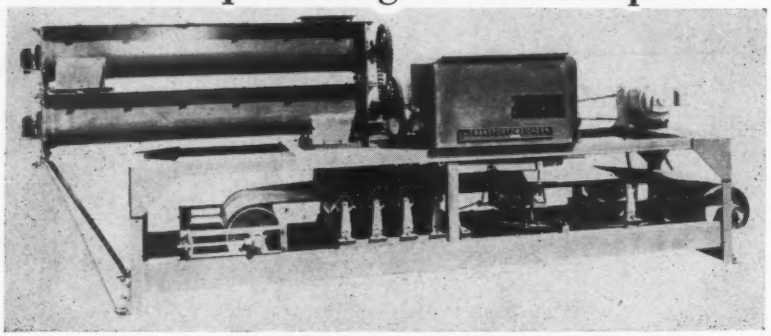
Leading the list of safe plants, Safety Director Vernon S. Gornto announced, was the company's Kinston, N.C. plant, which has not had a lost-time accident since March, 1949.

Second was the Danville, Va., unit, which boats a record of only six lost-time accidents since an active safety program was set in motion in the plant in July, 1947. Furthermore the Danville plant has operated for the last three years without a single lost-time accident.

Gornto is vice chairman of the Fertilizer Section of the National Safety Council.

Industrial News

2-1 Transportoweigher for Phosphate



New Automatic machine for transporting fertilizer materials.

Fertilizer manufacturers will be interested in a new feed regulating Transportoweigher for automatically and continuously transporting, weighing and maintaining pre-set rate of feed of any finely divided material.

As illustrated, the unit is designed to handle ground phosphate rock, 55 per cent—200 mesh and weighing approximately 75 lbs/cu. ft. The machine can be operated at pre-set capacities between 10 and 24 short tons an hour.

Capacity can be pre-set at any rate within the range by changing the knurled feed rate setting handwheel mounted inside the dust-tight scale cabinet.

Tonnage passing over the belt is recorded on a direct reading tonnage totalizer.

Complete details concerning the construction and application of the Transportoweigher are available in literature from the Sintering Machinery Corp. For further information fill out a **Reader Service** card, using **Code Number 2-1.**

Companies Join To Build Foreign Phosphate Plants

Two companies have agreed to combine their experience in building phosphate fertilizer plants throughout the world.

The companies are Gates Bros., Inc., of Wendell, Ida. and The Ralph M. Parsons Co., Los Angeles. Gates manufactures phosphate fertilizers, while the latter company does engineering and contracting.

Charles T. Gates, president of the company, said his organization has developed and is operating a modern high analysis fertilizer plant in which full use has been made of continuous processing techniques, requiring approximately three hours to complete the movement from raw rock phosphate to the finished product.

Parsons, head of the California company, said his organization will engineer and construct wet process phosphoric acid and triple superphosphate plants based on Gate's design.

Gates also announced approval at a recent stockholders meeting of a $2 million stock and bond issue to finance expansion of its triple super production.

Arkell & Smiths Appointee

New sales representatives in the western division of Arkell and Smiths is John K. McIntyre.

Fertilizer Section

The fertilizer group has received sectional status in the National Safety Council, John Smith, section president, announced.

The action followed a presentation by A. B. Pettit of Davison Chemical Co. to the policy committee of the Industrial Section of the council in New York City Dec. 15.

The status will provide a much wider scope of activity for the industry division, Smith said.

Carnegie Incorporates

Incorporation of Carnegie Chemical Mfg. Co., manufacturers and distributors of chemicals and fertilizers, was announced last month.

The corporation says it plans to distribute more than 25,000 tons of industrial chemicals and fertilizers on the West Coast during 1953.

Grace Backs Building Of Brazil DDT Plant

More DDT in the Sao Paulo area of Brazil will be one of the results of construction of a DDT and caustic soda-chlorine plant in that section.

In charge of construction is a company being formed by W. R. Grace & Co., American Home Products Corp. and Instituto Medicamenta Fontoura SA, a Brazilian company.

Grace will have a 55 per cent interest in the organization while the others will have 22½ per cent each.

Initial capacity of 4,000,000 pounds of DDT a year and 10 tons of chlorine a day have been scheduled for the structure.

Brazil presently imports all its DDT. Plans call for the new plant to supply the entire national requirements of the country for the insecticide.

Fertilizer Shipments Drop at End of 1952

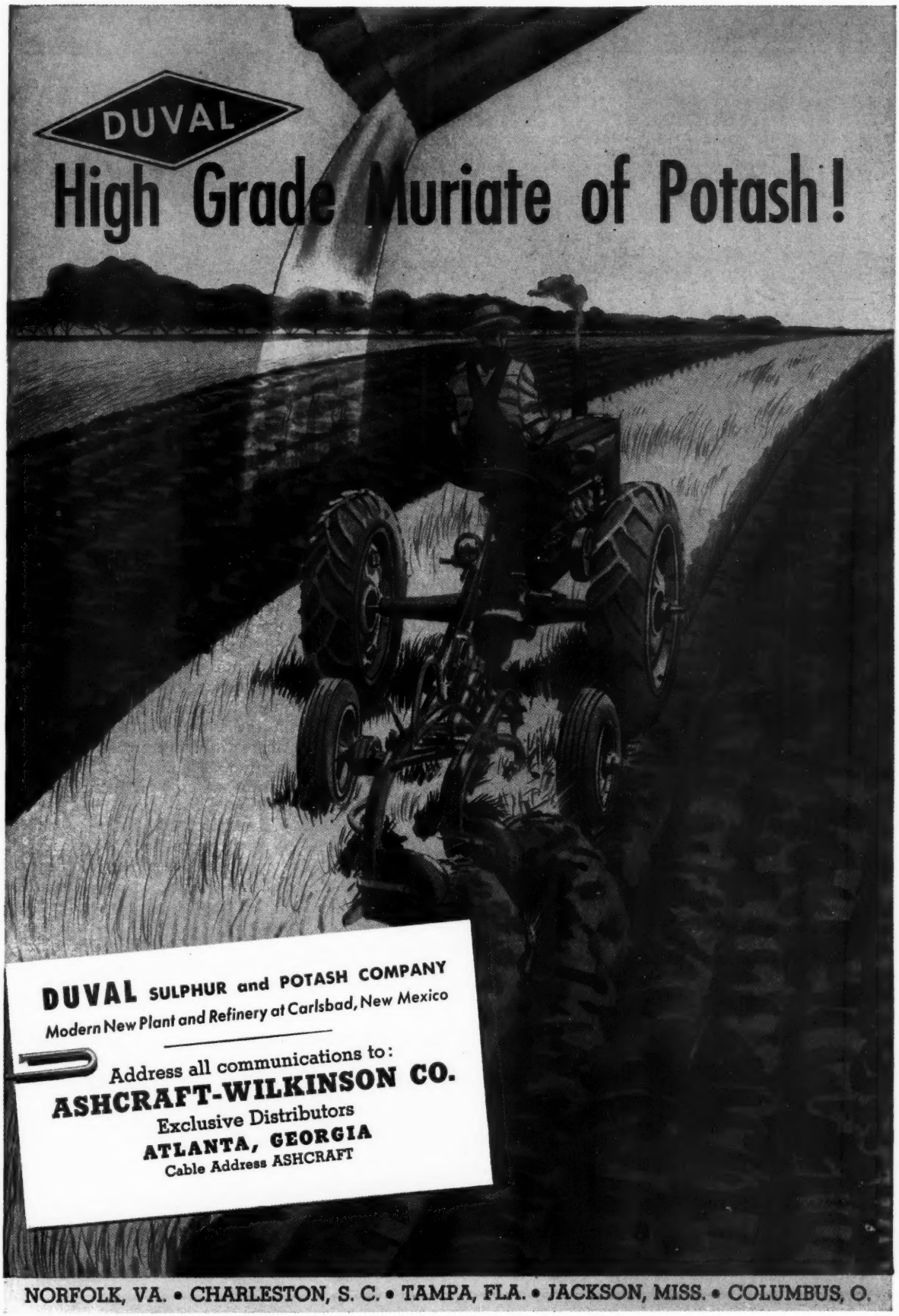
A decline in shipments of fertilizer during October and November of last year was reported last month in figures on tax tag sales and reports of shipments released by the National Fertilizer Association.

In equivalent tons the figure for November was 499,000 compared to 608,000 tons during the same month in 1951.

October figures show that equivalent of 559,000 tons of fertilizer were sold or shipped in reporting states—a drop of 117,000 from the 676,000 tons for the same month a year before.

Gatts Joins Fulton

William P. Gatts has joined the Los Angeles office of Fulton Bag & Cotton Mills. Gatts has had 19 years' experience in the bag business.



NORFOLK, VA. • CHARLESTON, S. C. • TAMPA, FLA. • JACKSON, MISS. • COLUMBUS, O.

Industrial News

Synthetic Ammonia Plant Set for S. A.

A $10 million synthetic ammonia and nitrogenous fertilizer plant has been planned for construction in Colombia. It will be located near Barracaberemeja and the oil field regions, according to a report from Bogota.

In charge of construction is Chemical Construction Corp., of New York City. The corporation has been at work on the project for two years.

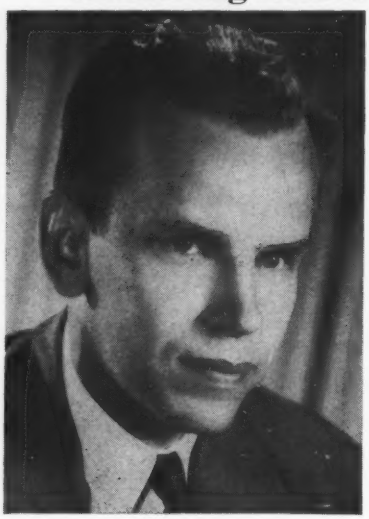
The plant will be the only source of nitrogenous fertilizer to be developed in Colombia. Natural gas, now going to waste in the oil field area, will be utilized in the production of the fertilizer products.

Wanted

WANTED: Plant Manager for Dry Mixing Plant located in Ohio. Must be capable in the handling of all plant operations, personnel and equipment. This is an unusually good opportunity for a qualified man to become associated with one of the large fertilizer companies. In reply give full particulars regarding self and salary desired. Address "380" c/o FARM CHEMICALS, Phila. 7.

Position available — Superintendent, Mixed Fertilizer Plant. Deep South, preferably with acidulating experience. Salary in proportion to ability. Address "385" care FARM CHEMICALS, Philadelphia 7.

Assuming Siems's Duties at Swift



A. H. Bowers

M. D. Sanders

Duties of the late Dr. H. B. Siems in the Plant Food division of Swift & Co., have been assumed by M. D. Sanders, of Chesterton, Ind.

He has the title of Director of Research, the post held by Dr. Siems before his death last Nov. 18.

The job of agronomist, also formerly supervised by Dr. Siems, will be taken over by A. H. Bowers of Downers Grove, Ill.

Sanders has been with Swift for 27 years, except for three years' service during World War II. He started with the company in 1925 as a chemist, becoming assistant to Dr. Siems in the Chicago Plant Food laboratory two years later. He was named manager of the Harvey, Ia., laboratory in 1932. He returned to Chicago in 1935 and since 1945 has served in his pre-war post with the lab in that city.

His new duties include supervision of all research related to plant food, insecticides and weed killers produced in the company's 27 plants.

Bowers, who joined the company in 1947 as assistant to Dr. Siems in the Plant Food division, will work with governmental and industrial authorities on plant nutrition and crop production.

Wilson Elected

New chairman of the executive committee of the board of directors of W. R. Grace & Co. is Charles E. Wilson, former president of General Electric Co. and first chairman of the Defense Mobilization Board. He joined Grace last year.

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Industrial News

Entomologist Says Red Mites Like Potassium

There may not be any practical application of the finding but an entomologist at the Connecticut Agricultural Experimental Station has found that red mites apparently like potassium.

The mites increased in numbers when fertilizers containing potassium were applied to plants, Dr. Philip Garman, the entomologist, noted.

On beans in greenhouse trials, Dr. Garman tried several forms of potassium—nitrate, chloride and sulfate—all with the same results. In every case where potassium was added mite populations increased. He also found that when calcium nitrate was put on, following potassium applications, the number of mites went down again.

Similar results were obtained in laboratory trials, where many kinds of fertilizers were tried on a variety of crops. Here, again, potassium was the offender. As potassium rates went up, so did the mite population in just about the same ratio. Again the effect could be counterbalanced by adding calcium.

Dr. Garman plans to make field experiments this year to determine whether the effect will be the same under outdoor growing conditions. If mite populations increase there when potassium fertilizer is applied entomologists may be able to take a big step toward the day when mites can be controlled by juggling the fertilizer formula.

International Enlarges

A substantial addition to its sulfate of potash facilities at Carlsbad, N. M. is planned by International Minerals & Chemical Corp.

Construction of the plant is set to start within the next few months, according to the company. It is scheduled to be in production early next year. Expansion will mean added production of approximately 35,000 tons of sulfate of potash a year.

Mealy Named Manager

New sales manager for direct application of rock phosphates for International Minerals & Chemical Corp. is J. L. Mealy.

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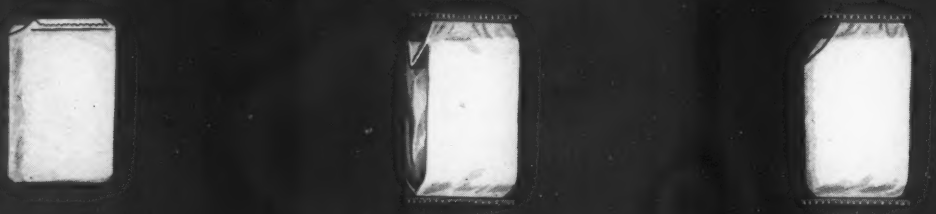

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Industrial News

Improved Herbicide

Commercial production of an improved MCP herbicide containing 90 per cent of 2-methyl-4-chlorophenoxyacetic acid, is planned by Monsanto Chemical Co.

Price of the product, the company states, represents a lower net cost to formulators on an active ingredient basis. The weed killer is called MCP-90.

The material is a hormone type herbicide, similar to 2,4-D in mode of action. Monsanto claims it is better tolerated by flax, various grasses, cereal crops and legumes.

Burns Discusses Bags

Construction and uses of multiwall bags were discussed recently by George N. Burns, of Chase Bag Co., before the senior class of Western Michigan College at Kalamazoo.

Burns, sales manager of the paper bag division of the company, repeated the talk at an evening session attended by executives of the paper-making industries in the Kalamazoo area.

Burn's talk is one of a series which will be used as the basis for the official textbook to be used in the courses on pulp and paper technology at Western Michigan.

Bemis Building Plant

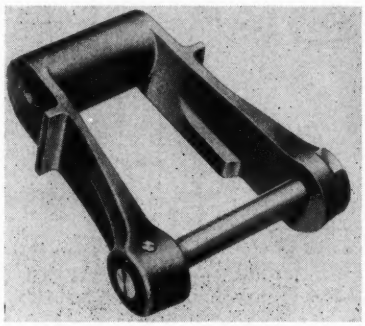
Bemis Bro. Bag Co. is building a new plant in Memphis, Tenn. for occupancy in April. The unit will contain 120,000 square feet of space, and will be composed of steel, concrete and brick.

Sulfur Controls Off

World controls on sulfur have been continued, despite the fact the were discontinued recently in the United States.

The news came from the International Materials conference last month. It had decided to continue world allocations of the chemical at least for the first quarter of 1953 on the chance that the improved supply situation may be only temporary.

2-2 "Dura-Tred" Elevator Chain



Beaumont-Birch Chain Link

Fertilizer and other chemicals are easy to handle if you use a bucket elevator chain developed by Beaumont Birch Co., the organization claims.

The chain for such jobs is the Beaumont "Dura-Tred" Beauco-CR Elevator Chain. Beauco-CR, the company explains, is far more resistant to acids and corrosion than cast steel or malleable iron.

Among the advantages claimed for the chain are the following: longer chain life, lower replacement costs, less maintenance and downtime and increased production.

When handling fertilizers and other bulk chemicals the chain is designed to give from four to five times more service life than the conventional No. c-132 chain. Thickness of the metal in the link barrel has been increased more than 300 per cent wherever wear normally occurs from contact between moving parts.

Complete information, including sizes and applications of the chain, is included in a company bulletin. To get the information fill out a **Reader Service** card, using **Code Number 2-2.**

Sixteen Bodies Recovered From Fertilizer Disaster

Sixteen bodies were recovered last month in the wreckage of a large fertilizer plant that blew up in Nagoya, Japan, the Associated Press reported. Police said 33 persons were seriously injured and 198 slightly hurt in the explosion which occurred in a tank of ammonium nitrate.

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Industrial News

OPS Approves Price Increase for Super

A price rise for bagged superphosphate finally was granted manufacturers of mixed fertilizers late last month by the Office of Price Stabilization

The OPS authorized the manufacturers to increase ceiling prices on bagged super to reflect freight rate increases which were authorized by federal or state regulatory bodies.

OPS also authorized manufacturers who operate more than one plant to continue the practice of establishing a uniform ceiling price for mixed fertilizers produced at various plants located in a single pricing area.

The actions were taken in Amendment 1 to Supplementary Regulation 114, General Ceiling Price Regulation and Amendment 1 to SR 31, Ceiling Price Regulation 22, effective Jan. 20.

Notice of the OPS rulings was distributed to all members of the National Fertilizer Association by the Washington staff of the association.

New Fertilizer Company

Farm Fertilizers, Inc. of Omaha, Neb. announces formation of a new company to be called Bennett Chemical Co.

S. L. Nevins, right, president of Mathieson Agricultural Chemicals Co., Baltimore, Md., discusses the new 4-H Alumni Recognition Program with G. L. Noble, director of the National Committee on Boys and Girls Club Work. Mathieson is donating awards for the program which will provide two national and four state awards. Four men and four women will receive national honors.

Lee Ashcraft Elected To Executive Position

Lee Ashcraft, one of the founders of Ashcraft-Wilkinson Co., has been named chairman of the executive committee of the company.

In other personnel changes George W. McCarty was elevated to chairman of the board from his former post as president. Van W. Wilkinson succeeded McCarty as head of the organization.

McCarty joined the company in 1916 and had served as its president since 1944. Wilkinson, formerly vice president has been associated with the company since its founding in 1912.

Following other promotions were announced: John E. Foy Jr. of Tampa, Fla., to vice president; Walter J. Fargason of Atlanta, to secretary and treasurer and W. Mercer Rowe Jr. of Atlanta, to assistant vice president. Rowe will be in charge of Ashcraft's pesticide division.

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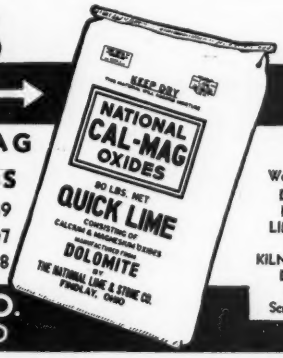

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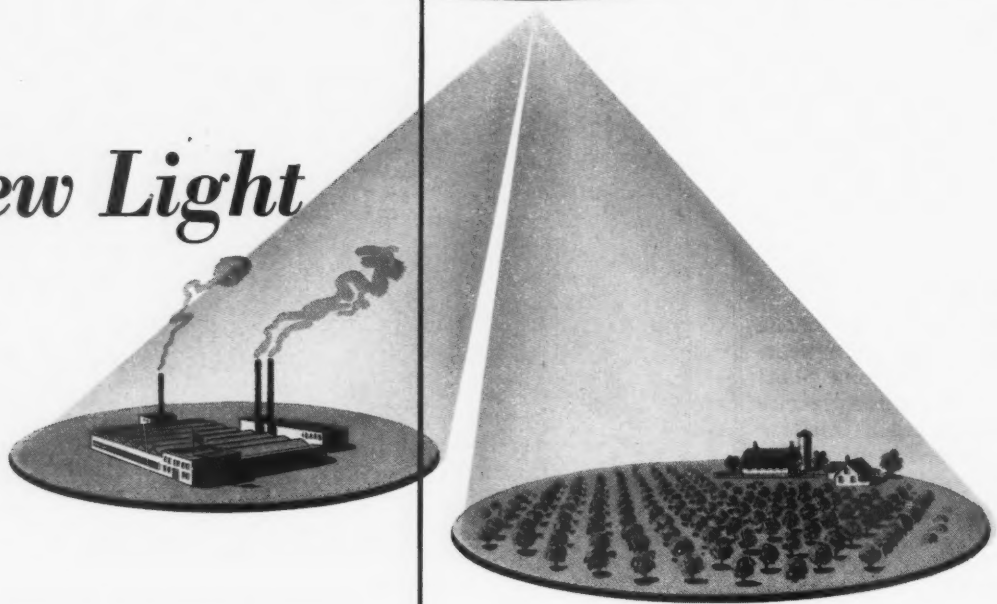

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ON OLD SUBJECTS...

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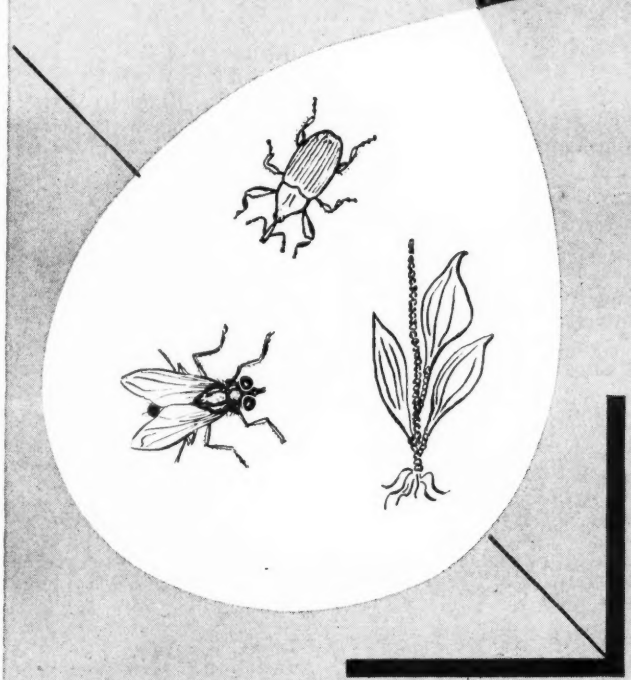

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DIAMOND ALKALI CHEMICALS

Industrial News

Monsanto Head Cites Value of Insecticides

Farm production could be completely curtailed in 50 years if insects were left alone. That warning was sounded last month by Charles A. Thomas, president of Monsanto Chemical Co.

Thomas made the statement following acceptance of the 47th impression of the Perkin Medal, highest award for achievement in American industrial chemistry.

In discussing a hypothetical moratorium on scientific progress for a 50-year period, Thomas said the disastrous insect situation would arise from the tendency of insects to build resistance to pesticides.

"With a moratorium on science," he asked, "how would we compete with hordes of insects that would appear to ravage our crops?"

Thomas also is chairman of the board of directors of the American Chemical Society.

Porter, Hunter Promoted By Nitrogen Division

Two staff elevations were announced late last month by Nitrogen Division, Allied Chemical and Dye Corp.

Involved in the promotions were John J. Porter and Malcolm E. Hunter. Porter, formerly assistant director of sales, was named assistant to the executive vice president.

Hunter was moved up to fill Porter's post. He had been sales manager of direct application fertilizer materials for the division. The appointments became effective Jan. 1.

Simms Promoted

Robert C. Simms

Robert C. Simms has been named executive vice president of Thurston Chemical Co., Joplin, Mo. Simms formerly served as vice president in charge of company expansion.

He also is a member of the board of directors of the company. Simms joined Thurston in 1951 as assistant to the president. He had been associated with Naco Fertilizer Co. for 24 years prior to joining Thurston.

Soil Conditioner Patents

Monsanto Chemical Co. was issued two U. S. patents pertaining to synthetic organic chemical soil conditioners last month. The first pertains to a large class of organic polyelectrolytes as soil conditioners (including Monsanto's Krilium.) The other is concerned with plant fertilizing compositions containing plant nutrients and certain synthetic organic polyelectrolytes.

Chemicals Recommended By USDA for Mite Control

Several pesticide materials have been recommended by the USDA for control of orchard mites in the Pacific Northwest which are resistant to parathion.

The chemicals include DMC, EPN, malathon, R-242 and 88R.

Up to recently parathion did a good job in controlling the mites but observations during 1951 and 1952 indicated that at least three species of the insects have developed resistance to the potent pesticide.

Basis for the new recommendations is the work done at the Bureau of Entomology and Plant Quarantine division at Yakima, Wash.

OPS Allows Price Rise For Fertilizer Industry

Following the adjustments for increased freight costs allowed the fertilizer industry last month, the Office of Price Stabilization also issued adjustments for ceiling prices on sales of mixed fertilizers and bagged superphosphate.

The regulation, along with modifications in the general ceiling price regulation for manufacturers of chemicals, had to be issued so that all manufacturers of mixed fertilizer and those who bag superphosphate can raise their production-point selling price ceiling one per cent.

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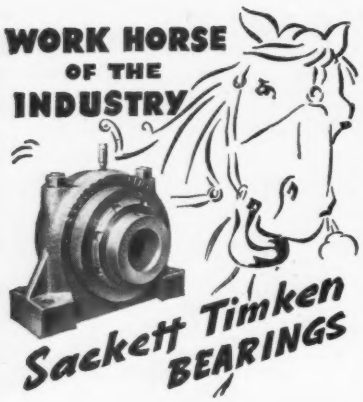

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Industrial News

2-3 Safety Hat

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The need in many industrial plants for a more rugged safety hat with longer life has been met by United States Safety Service Co., it says in literature describing its Saf-Hed-Hat.

In addition the head piece is light in weight and comfortable to wear. Constructed of fiber glass, it offers the greatest strength-weight ratio of any material currently being used in the manufacture of safety hats, the company states.

The hat meets all standard safety specifications for dielectric breakdown and impact resistance.

To get further information on the Saf-Hed-Hat, fill out a **Reader Service** card, using **Code Number 2-3.**

Statements on Sulfur From Various Fronts

There's a lot of news on the sulfur front this month. In three separate reports these were the highlights of various phases of the situation:

1. More than 900,000 long tons per year of new productive capacity were added last year in free world efforts to increase the supply of sulfur.

2. A belated report on sulfur output in 1951 revealed that production of Frasch sulfur in the United States increased to a record 5,278,249 long tons—two per cent more than in 1950. Stocks in producers' hands increased seven per cent during the year, the Bureau of Mines of the U.S. Department of the Interior announced.

3. Industrial expansion plans in Europe are being hampered by the sulfur shortage, according to the Organization for European Economic Security.

The first report, prepared by Freeport Sulphur Co., described the increase made available by 28 projects in eight nations. Ranking first with 16 projects was the U.S. They accounted for estimated production of approximately 700,000 tons of the chemical.

Canada was second with five projects totaling 84,000 tons and Mexico third with two for 13,000 tons. Single projects, with their capacities, were listed for the following countries: Norway, 75,000; Sweden, 14,000; Ecuador, 10,000; England, 10,000 and Austria, 5,000 tons.

Second report, from the Bureau of Mines, stated also that sales were lower than in 1950 because producers' stocks had been reduced to such a low point that further drafts upon them were considered unwise.

It added that domestic production of pyrites increased during 1951 as did output of the various byproduct forms such as smelter acid, recovered sulfur, hydrogen sulfide and sulfur dioxide.

Total production in all forms increased from 5,986,482 long tons in 1950 to 6,196,859 tons in 1951.

In the report from the OEEC, the committee said Europe will face a deficit of 200,000 tons of sulfur annually in 1955 and an even greater percentage deficit of sulfuric acid than now is experienced.

It stated that only a slight reduction in United States consumption, releasing more sulfur for export, could make up the European shortage.

It cautioned, however, that the sulfuric acid shortage presents a problem that must be met by economies on its use, including production of fertilizers using less or no sulfur.

Mochi Promoted

Pittsburgh Agricultural Chemical Co. announces promotion of J. Donald Mochi to sales representative. He formerly was assistant to Dr. J. B. Skaptason, vice president of the company.

6 NEW PLANTS NOW UNDER CONSTRUCTION

These brilliant performers of advanced Sackett design will, upon completion, have a combined annual production capacity of well over 300,000 tons.

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. . . Granular Insecticides

(*Continued from page 21*)

the run insured a uniform flight pattern. Areas of land flown by this procedure had an essentially uniform distribution of particles on the soil irrespective of the overhead cover of trees, shrubs, grass or crops.

Fitting the Plane

Other than wiring off of the agitator no changes are necessary on an airplane equipped for dusting for handling granulated insecticides. Flow properties of granulated mixtures are such that they will feed uniformly from an airplane. An experienced pilot can learn quickly the proper feed in accordance with the characteristic of his ship. A full pay load to the capacity of the ship may be carried at each trip.

Tractor driven row crop duster equipment may be used to distribute granular insecticides. The packing characteristic of the material may stop the agitator on some equipment when the hopper is completely filled. Because no agitation is required other than to feed the unit the agitator may be removed when it gives trouble.

Several manufacturers are providing adjustments on their equipment to give less difficulty with this type of material. To obtain a maximum distribution nozzles must be operated at the highest level from the soil.

For small lots the cyclone grass seeder may be used to cover several acres. For lawns and gardens broadcasting by hand will give satisfactory coverage. With a fertilizer attachment the granulated insecticide may be mixed in the hopper with the fertilizer and applied along with it. The new type fertilizer spreaders work well for broadcasting granular insecticides either alone or mixed with fertilizer or soil lime.

When it is desirable to place the insecticide in close contact with the insects in the soil, the kinds of insects in the soil that may be controlled by the method are unlimited. Amount and kind of insecticide applied may be varied within wide limits to suit the particular insect problem.

Results with Corn

In the case of late corn heavily infested with corn earworm in the whorl stage a single application of five per cent granular dieldrin or 25 per cent granular toxaphene completely eliminated the infestation within 48 hours.

Good reports have been received on Green June beetles in pastures, corn rootworms in corn and peanuts, sod webworms in pastures and lawns, chinch bugs in pastures and golf courses, ants in lawns, mosquitoes and sand flies in marshes, white-fringed beetles in cultivated and non-cultivated land and cutworms in gardens and truck crops.

For treating soil, a higher performance per unit of insecticide may be expected where the treatment is worked into the soil. Where the soil is not to be worked up after treatment the amount applied should be doubled per unit of area treated. For pastures and non-cultivated land the following levels have been tried:

In pounds technical applied per acre—aldrin—5; dieldrin—2½; heptachlor—3.75; chlordane—7; toxaphene—25; DDT—25 and parathion—1.

Granulated insecticides should not be confused with dusts in any sense of the word. Under favorable conditions the granular material does not adhere to foliage, but falls through the ground cover on to the soil surface.

It should be considered as a means of applying known amounts of insecticides to the soil surface without undue loss of the chemical from drift. The physical character of the product makes it one that may be handled in conventional farm machinery.

Summary

1. A granular insecticide may be any of the insecticides impregnated on to inerts of 30/60 mesh range in particular size.

2. Equipment designed for applying conventional dusts may be used to apply granular insecticides with very little modification.

3. The formulation does not adhere to foliage but penetrates heavy cover to fall on the surface of the soil.

4. Where the formulation is adaptable it offers promise in the control of many soil infesting insects and in other specialized problems. ◆

Malathon Available In Several Formulations

American Cyanamid's organic phosphate insecticide malathon will be available to growers this year as wettable powder, dust and emulsifiable liquid formulations, the company announced.

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Sturtevant Mill Co., Boston, Mass.
Titlestad Corporation, Nicolay, New York City

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American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Davison Chemical Corporation, Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.
Mathieson Agricultural Chemicals Co., Little Rock, Ark.
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Virginia-Carolina Chemical Corp., Richmond, Va.

FILLERS
McIver & Son, Alex. M., Charleston, S. C.

FISH SCRAP AND OIL
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston. S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

FULLER'S EARTH
Ashcraft-Wilkinson Co., Atlanta, Ga.

FUNGICIDES
American Agricultural Chemical Co., N. Y. C.
Andrews Sales, Inc., W. R. E., Philadelphia, Pa.
Berkshire Chemicals, New York City
DuPont de Nemours & Co., E. I., Wilmington, Del.
Gen. Chem. Div., Allied Chem. & Dye, N. Y. C.
Tennessee Corp., Atlanta, Ga.

GAS MASKS
Willson Products, Inc., Reading, Pa.

GOGGLES
Willson Products, Inc., Reading, Pa.

HERBICIDES
DuPont de Nemours & Co., E. I., Wilmington, Del.
Lion Oil Company, El Dorado, Ark.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Agricultural Chemical Co., N. Y. C.

HERBICIDES—Oils
Lion Oil Company, El Dorado, Ark.

HOPPERS & SPOUTS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind..

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Ashcraft-Wilkinson Co., Atlanta, Ga.
Berkshire Chemicals, New York City
DuPont de Nemours & Co., E. I., Wilmington, Del.
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Woodward & Dickerson, Inc., Philadelphia, Pa.

INSECTICIDES
American Agricultural Chemical Co., N. Y. C.
Andrews Sales, Inc., W. R. E., Philadelphia, Pa.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Berkshire Chemicals, New York City
DuPont de Nemours & Co., E. I., Wilmington, Del.
Julius Hyman & Co. Div., Shell Chemical Corp., Denver, Colo.
Pittsburgh Agricultural Chemical Co., N. Y. C.
Powell & Co., John, New York City
Tennessee Products & Chem. Corp., Nashville Tenn.
Virginia-Carolina Chemical Corp., Richmond, Va.

IRON SULFATE
Tennessee Corp., Atlanta, Ga.

LEAD ARSENATE
American Agricultural Chemical Co., N. Y. C.

LIMESTONE
American Agricultural Chemical Co., N. Y. C.
Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.
National Lime & Stone Co., Findlay, Ohio
Pittsburgh Agricultural Chemical Co., N. Y. C.

Buyers' Guide

Classified Index to Advertisers in 'Farm Chemicals'

LOADERS—Car and Wagon
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Acid Making and Handling
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Acidulating
Chemical Construction Corp., New York City
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Ammoniating
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Granulating, Fertilizer
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Grinding and Pulverizing
Atlanta Utility Works, The, East Point, Ga.
Bradley Pulverizer Co., Allentown, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Material Handling
Atlanta Utility Works, The, East Point, Ga.
Hayward Company, The, New York City
Hough, The Frank G. Co., Libertyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Mixing, Screening and Bagging
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.
Sturtevant Mill Co., Boston, Mass.

MACHINERY—Power Transmission
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY
Superphosphate Manufacturing
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MAGNESIUM SULFATE
Berkshire Chemicals, New York City

MANGANESE SULFATE
McIver & Son, Alex. M., Charleston, S. C.
Tennessee Corp., Atlanta, Ga.

MANURE SALTS
Potash Co. of America, New York City

MINOR ELEMENTS
Andrews Sales, Inc., W. R. E., Philadelphia, Pa.
Tennessee Corporation, Atlanta, Ga.

MIXERS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

NITRATE OF POTASH
Berkshire Chemicals, New York City

NITRATE OF SODA
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NITROGEN SOLUTIONS
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Lion Oil Company, El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

NITROGEN MATERIALS—Organic
American Agriculture Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NOZZLES—Spray
Monarch Mfg. Works, Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.

PARATHION
American Cyanamid Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Agricultural Chemical Co., N. Y. C.

PENTACHLOROPHENOL
Monsanto Chemical Co., St. Louis, Mo.

PHOSPHATE ROCK
American Agricultural Chemical Co., N. Y. C.
American Cyanamid Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Virginia-Carolina Chemical Corp., Richmond, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

PHOSPHORIC ACID
American Agricultural Chemical Co., N. Y. C.
Monsanto Chemical Co., St. Louis, Mo.
Virginia-Carolina Chemical Corp., Richmond, Va.

PLANT CONSTRUCTION—Fertilizer and Acid
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
General Industrial Development Corp., N. Y. C.
Monsanto Chemical Co., St. Louis, Mo.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.
Titlestad Corporation Nicolay, New York City

POTASH—Muriate
American Potash & Chemical Corp., N. Y. C.
Ashcraft-Wilkinson Co., (Duval Potash) Atlanta, Ga.
Duval Sulphur & Potash Co., Houston, Tex.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Potash Co. of America, New York City
Southwest Potash Corp., New York City
United States Potash Co., N. Y. C.

POTASH—Sulfate
American Potash & Chemical Corp., N. Y. C.
International Min. & Chem. Corp., Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Potash Co. of America, Washington, D. C.

POTASSIUM PHOSPHATE
Monsanto Chemical Co., St. Louis, Mo.

PRINTING PRESSES—Bag
Schmutz Mfg. Co., Louisville, Ky.

PYROPHYLLITE
Ashcraft-Wilkinson Co., Atlanta, Ga.

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Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

RESPIRATORS
Willson Products, Inc., Reading, Pa.

SACKING UNITS
Sackett & Sons Co., The A. J., Baltimore, Md.

SCALES—Including Automatic Baggers
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

SCREENS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

SEPARATORS—Air
Sackett & Sons Co., The A. J., Baltimore, Md.

SOIL CONDITIONERS
Goodrich Chemical Co., B. F., Cleveland, Ohio

SPRAYS
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.

STORAGE BUILDINGS
Marietta Concrete Corporation, Marietta, Ohio

SULFATE OF AMMONIA
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.
Jackle, Frank R., New York City
Lion Oil Co., El Dorado, Ark.
McIver & Son, Alex. M., Charleston, S. C.
Phillips Chemical Co., Bartlesville, Okla.
United States Steel Corp., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFATE OF POTASH—MAGNESIA
International Min. & Chem. Corp., Chicago, Ill.

SULFUR
Ashcraft-Wilkinson Co., Atlanta, Ga.
Mathieson Agricultural Chemicals Co., Little Rock, Ark.
Texas Gulf Sulphur Co., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULFUR—Dusting & Spraying
Ashcraft-Wilkinson Co., Atlanta, Ga.
DuPont de Nemours & Co., E. I., Wilmington, Del.
U. S. Phosphoric Products Div., Tennessee Corp., Tampa, Fla.

SULFURIC ACID
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
International Min. & Chem. Corp., Chicago, Ill.
Lion Oil Company, El Dorado, Ark.
Monsanto Chemical Co., St. Louis, Mo.
McIver & Son, Alex. M., Charleston, S. C
Southern States Phosphate Fertilizer Co., Savannah, Ga.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

SUPERPHOSPHATE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Davison Chemical Corporation, Baltimore, Md.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
Mathieson Agricultural Chemicals Co., Little Rock, Ark.
McIver & Son, Alex. M., Charleston, S. C.
Southern States Phosphate Fertilizer Co., Savannah, Ga.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

SUPERPHOSPHATE—Concentrated
Armour Fertilizer Works, Atlanta, Ga.
International Min. & Chem. Corp., Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TALC
Ashcraft-Wilkinson Co., Atlanta, Ga.

TANKAGE
American Agricultural Chemical Co., N. Y. C.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
International Min. & Chem. Corp., Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

TEPP
Monsanto Chemical Co., St. Louis, Mo.
Virginia-Carolina Chemical Corp., Richmond, Va.

TOXAPHENE
Ashcraft-Wilkinson Co., Atlanta, Ga.
Pittsburgh Agricultural Chemical Co., N. Y. C.

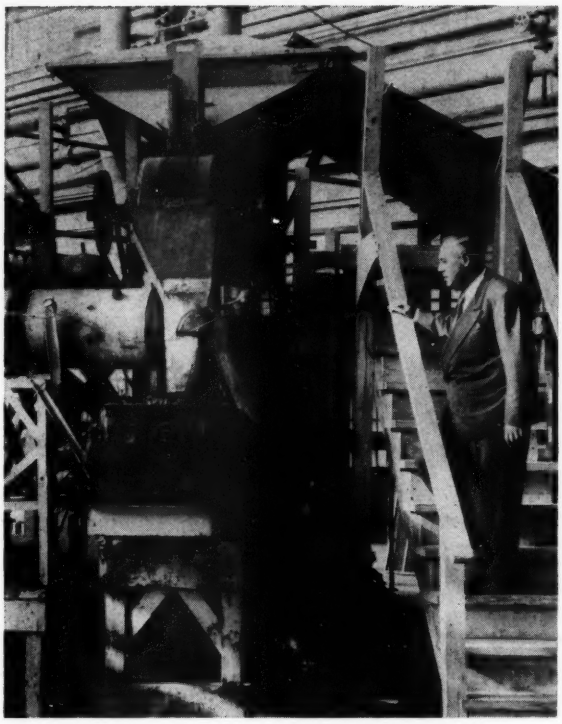
2, 4-D
DuPont de Nemours & Co., E. I., Wilmington, Del.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Agricultural Chemical Co., N. Y. C.

2, 4, 5-T
DuPont de Nemours & Co., E. I., Wilmington, Del.
Monsanto Chemical Co., St. Louis, Mo.
Pittsburgh Agricultural Chemical Co., N. Y. C.

UREA & UREA PRODUCTS
DuPont de Nemours & Co., E. I., Wilmington, Del.
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C

VALVES
Atlanta Utility Works, The, East Point, Ga.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.

ZINC SULFATE
Tennessee Corp., Atlanta, Ga.



Nitric phosphates made in

TVA Pilot Plant

IN THE development of nitric phosphate processes for manufacturing fertilizers, the Tennessee Valley Authority has been one of the pioneers in this country.

Any process which saves sulfuric acid these days, or which substitutes another acid for it is of special interest to the industry, with sulfur in limited supply.

Pilot Plant for Process

The photo above shows the drying and mixing section of the TVA pilot plant used for developing the new process.

Viewing the operation is Charles Young, manager of chemical engineering for the Authority.

The pilot plant is located in Muscle Shoals, Ala. In the process under survey at the pilot plant, nitric acid may replace part or all of the sulfuric acid normally used in the acidulation of phosphate rock.

The resulting product, according to TVA, will be a homogenous, granular fertilizer containing higher concentrations of plant food than those in the usual chemical fertilizers.

To Encourage Producers

Construction of a production scale plant to provide additional technical information necessary to encourage small producers unable to afford extensive pilot plant research is planned.

First commercial use of the TVA processes will be in a plant under construction by a private company at the Muscle Shoals site. ◆

Alphabetical List of Advertisers

American Agricultural Chemical Co., New York City..... 8
American Cyanamid Co., New York City..... —
American Potash and Chemical Corp., New York City..... 66
Andrews Sales, Inc., W. R. E., Philadelphia, Pa..... —
Arkell & Smiths, Canajoharie, N. Y..... —
Armour Fertilizer Works, Atlanta, Ga..... 45
Ashcraft-Wilkinson Co., Atlanta, Ga.....45, 59
Atlanta Utility Works, The, East Point, Ga..... 64
Atlas Powder Co., Wilmington, Del..... 32
Bailey & Lerch, Washington, D. C..... 63
Baker & Bro., H. J., New York City..... 1
Bemis Bro. Bag Co., St. Louis, Mo..... 4
Berkshire Chemicals Inc., New York City..... 56
Bradley Pulverizer Co., Allentown, Pa..... 64
Chase Bag Co., Chicago, Ill..... —
Chemical Construction Corp., New York City..... 26
Davison Chemical Corporation, Baltimore, Md..... —
Diamond Alkali Co., Newark, N. J..... 67
DuPont de Nemours & Co., E. I., Wilmington, Del..... —
Duval Sulphur & Potash Co., Houston, Tex..... 59
Fairlie, Andrew M., Inc..... —
Gascoyne & Co., Inc., Baltimore, Md..... 64
General Industrial Development Corp., New York City... 47
Goodrich Chemical Co., B. F., Cleveland, Ohio..... 61
Hammond Bag & Paper Co., Wellsburg, W. Va..... —
Hayward Company, The, New York City..... 64
Hough, The Frank G., Libertyville, Ill..... 30
Hudson Pulp & Paper Corp., New York City..... 19
International Paper Co., Bagpak Div., New York City.... 34
International Minerals & Chemical Corp. Chicago, Ill.....Back Cover
Jackle, Frank R., New York City..... 69
Jaite Company, The, Jaite, Ohio..... 72
Keim, Samuel D., Philadelphia, Pa..... 69
Kraft Bag Corporation, New York City..... 62
Lion Oil Company, El Dorado, Ark..... 23
Marietta Concrete Corp., Marietta, Ohio..... —
Mathieson Agricultural Chemicals Co., Little Rock, Ark... —
McIver & Son, Alex. M., Charleston, S. C.....52, 60, 69
Mente & Co., New Orleans, La..... 52
Monarch Mfg. Works, Inc., Philadelphia, Pa..... 64
Monsanto Chemical Co., St. Louis, Mo..... 14
National Lime & Stone Co., Findlay, Ohio..... 65
Nitrogen Division, Allied Chemical & Dye Corp., New York City.....Front Cover
Phillips Chemical Co., Bartlesville, Okla..... 6
Pittsburgh Agricultural Chemical Co., New York City..... —
Potash Co. of America, Washington, D. C. .....Third Cover
Powell & Co., John, New York City..... —
Raymond Bag Co., Middletown, Ohio..... 50
Sackett & Sons Co., The A. J., Baltimore, Md.....70, 71
Schmutz Mfg. Co., Louisville, Ky..... 42
Shell Chemical Corporation, Denver, Colo.....Second Cover, 40
Shuey & Company, Inc., Savannah, Ga..... 64
Southern States Phosphate & Fertilizer Co., Savannah, Ga. 64
Southwest Potash Corporation, New York City..... —
Spencer Chemical Company, Kansas City, Mo..... 54
Spraying Systems Co., Bellwood, Ill..... 52
Stedman Foundry and Machine Co., Inc., Aurora, Ind..... 68
Sturtevant Mill Co., Boston, Mass..... 11
Tennessee Corporation, Atlanta, Ga.....5, 36
Tennessee Products & Chemical Corp., Nashville, Tenn.... —
Texas Gulf Sulphur Co., New York City..... —
Titlestadt Corp., Nicolay, New York City..... 56
Union Bag & Paper Corp., New York City..... 2
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla..... 69
United States Potash Co., New York City..... 22
United States Steel Corp., Coal Chem. Sales Div., New York City..... —
Virginia-Carolina Chemical Corp., Richmond, Va..... 38
Wiley & Company, Inc., Baltimore, Md..... 64
Willson Products, Inc., Reading, Pa..... 55
Woodward & Dickerson, Inc., Philadelphia, Pa..... 56

But Who Wants Normalcy?

NOT many officials in the pesticide industry were "pointing with pride" at last year's sales records as the new year started.

There was no smug feeling of contentment about the season just completed.

Reasons for headaches in the industry which produces insecticides, fungicides, herbicides and all the other chemicals which contribute to the well being of crops were well founded.

Last season was a bad one. It hit hardest at two types of pesticide manufacturers:

1. The small newcomer to the field who couldn't stand the shock of a poor season upon entering the farm chemicals field.

2. The manufacturers (big and small) who depend for their business livelihood on sales to the cotton South. As everyone knows, the bugs stayed away in droves from the cotton fields; chemicals to kill them just weren't needed.

Nevertheless, there was a distinct air of optimism among pesticide manufacturers—at least among the ones with whom we talked at the National Agricultural Chemicals Association convention in Spring Lake last September.

As we reported in our October article, covering that convention, representatives at the session, despite concern over the bad season, were talking about expansion of plants, new products and new methods for helping the farmer do a better job.

But even with this predominant undercurrent of optimism in the industry the multi-million dollar question remains:

How can our company prepare to weather possible future seasons like the one we just underwent?

In summarizing the pesticide manufacturers situation in the Jan. 5 issue of *Chemical and Engineering News*, Lea S. Hitchner, executive secretary of the NAC said that season was remarkable "because it signaled the return of a more normal condition in the marketing of pesticides."

Many persons in the industry may be tempted to quip: "Yes, but who wants normalcy?" A good question.

There is an answer to this basic problem that will continue to face everyone connected with the industry. At least there are some suggestions for answering it.

Some of them are given by Hitchner in his article. Others are indicated by the general setup of the pesticide industry. Here are some which seem pertinent:

1. Encourage the dealer and grower to purchase supplies in advance of the season of use.

2. Increase exports to foreign countries.

3. For those companies which channel their products primarily toward cotton, consider this fact: One-fourth of all pesticides produced in this country are aimed at that market. If insect infestations are light there, the whole industry feels the slump. Some diversification of products—aimed at several different fields of use—would seem indicated to provide a bumper against the shock of a decreased demand among cotton growers.

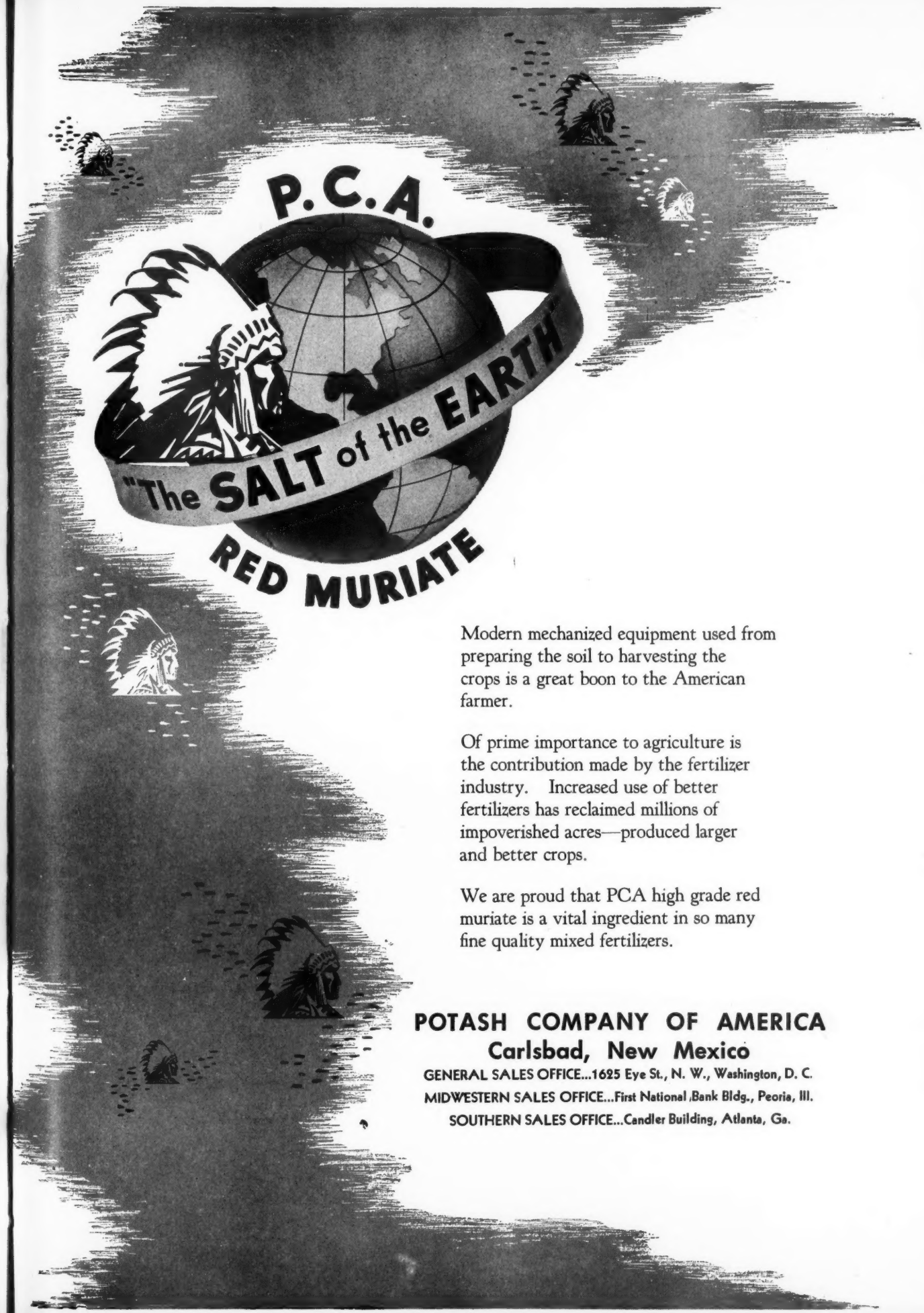
4. Continue to seek new fields for pesticide products. (The recent emphasis on grassland farming is one example.)

5. Follow the insect situation closely. Know where the insects are, where they are heading and how heavy the infestation is, so that marketing and distribution of chemicals may be varied accordingly. (FARM CHEMICALS carried a monthly roundup of latest pest information from state and federal units last summer to help in this. We plan to continue that service this season.)

NO matter what the seasonal fluctuations, pesticides will continue to be needed for the protection of crops. (The USDA has credited the chemicals with a 50 per cent increase in farm production during the past 20 years.)

But by a program of education for those who buy the chemicals, diversification of products to provide a better balance to individual businesses and close observation of the regional pest situation, manufacturers will be better able to ride out the ups and downs of an ever vacillating demand for their products.

—HAMILTON C. CARSON



Modern mechanized equipment used from preparing the soil to harvesting the crops is a great boon to the American farmer.

Of prime importance to agriculture is the contribution made by the fertilizer industry. Increased use of better fertilizers has reclaimed millions of impoverished acres—produced larger and better crops.

We are proud that PCA high grade red muriate is a vital ingredient in so many fine quality mixed fertilizers.

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